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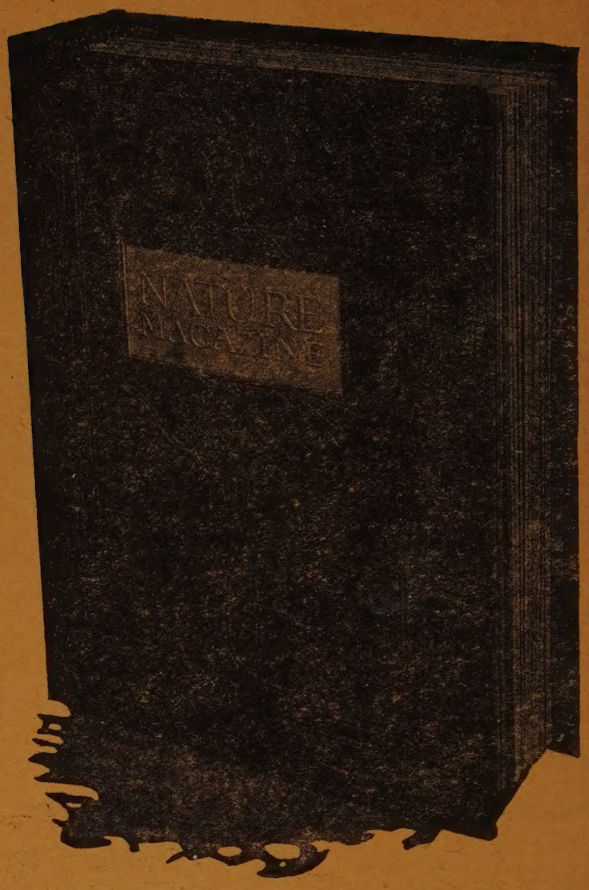

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Baltimore County Sanctuary

Outstanding among the humane organizations in this country is the Humane Society of Baltimore County, Maryland. Beside notably successful work in the humane field, it has another great asset that might well be emulated by other groups in this field of constructive endeavor. This is a subsidiary bird club that has established and maintains a demonstration wildlife sanctuary—The Sanctuary of St. Francis of Assisi—at Pikesville. Under the direction of Mrs. Gardner Tillinghast, this eight-acre reservation has been specially planted with berry-bearing shrubs, provided with feeding stations and bird houses, developed as a Nature study center with a Nature trail, and otherwise made into a demonstration of what one can do with a small acreage —which, in this case, may soon be increased to twenty-five acres. The Bird Club, of which Mrs. John L. Cotsworth is chairman and Mrs. Herman F. Kuch, Jr., secretary, distributes bird food in winter, and otherwise aids members and others in developing hospitality to birds around individual homes. A bird talk, with slides, is given free to garden clubs, young people groups and other organizations interested in birds. Too often humane associations confine their concern largely to domestic animal life when wildlife, its existence complicated by human civilization, needs humane consideration as well. The Humane Society of Baltimore County is showing the way.

Botany

An Introduction to Botany. By Arthur W. Haupt. New York. 1946. The McGraw-Hill Book Company. 425 pages. Illustrated. $3.50.

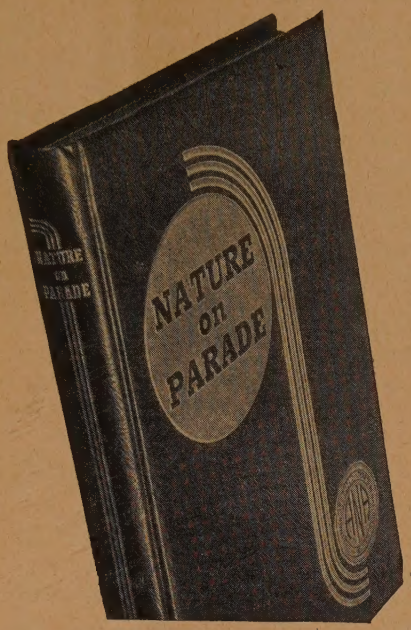
This is a second edition of this botany textbook by the associate professor of botany at the University of California at Los Angeles. It seeks to present "clearly and concisely such basic facts and principles concerning plants as are essential to an understanding of their structure, functions, life relations, and evolution." In this second edition a number of new illustrations have been included.

Forests and Waters

"Water and Our Forests" is the title of a new booklet, published by the U .S. Forest Service, showing the role of denuded forest land and unwise use of forests on upland watersheds as a major contributor to flood disasters. It demonstrates the value of well-managed forests on uplands to hold back water, checking erosion and its partner, flood. Copies of the booklet are available from the U. S. Forest Service, Department of Agriculture, South Building, Washington 25, D. C.

NATURE ON PARADE

VOLUME NUMBER TWO)



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Nature in Print

By HOWARD ZAHNISER

RECENTLY in the small area of his office where the Editor of this magazine leaves new books for me I found two volumes entitled *Narcotics and Drug Addiction* and *Cities Are Abnormal.* He assures me that their appearance together was purely coincidence, and now in the good cheer that follows a second cup of evening coffee, having read both books from cover to cover, I take my pen in hand, primarily to share with others Elmer T. Peterson's collection of articles by a dozen contributors (and himself) on our urban perplexities—but also to meet to some extent at least a reviewer's obligation with reference to this other volume.

Whether narcotics have any causal relation one way or the other to city complaints I am not sure. Furthermore, on this page at least, I presume it is enough to notice that there is such a book as *Narcotics and Drug Addiction,* the availability of which we apparently owe to our exploitation of the Nazis, it being stated on the volume's copyright page that it is "translated, published and distributed in the public interest by authority of the Alien Property Custodian under special license." Nevertheless, I must not neglect to state that the work contains much technical, natural-history, and other information regarding substances that I shall not even mention here. As Coolidge's pastor felt about sin, it's 'agin 'em. As to coffee—to choose an example that is surely at least mentionable—I learn that it is classed as a purine drug, and that caffeinism is "current among intellectual workers" and "women working by night." And I read with both exaltation and dismay:

"The first symptom of the effect of coffee consists in a multiplication and clarification of the elements of perception. The combinatory performance improves, everything is sensed more abundantly. . . . There appears also a sensation of general well-being, and stimulation. When stronger doses of coffee are taken, these symptoms are replaced by an uninhibited urge to talk, high excitation, and loud loquaciousness. . . . An addiction causes insomnia, restlessness, irritability. The addicts complain of shooting pains, pressure and contractive pains in the heart region. Irregularities of the pulse and extrasystoles manifest themselves unpleasantly."

I trust that these few comments and this sample adequately represent *Narcotics and Drug Addiction.* And now, before these latter symptoms overtake me, while my perception is clarified and my combinatory performance is improved by this purine drug, I must hasten to exploit my "uninhibited urge to talk"—about *Cities Are Abnormal.*

* * *

Probably the most arresting thought, and, at the same time, the greatest contribution to hope in *Cities Are Abnormal,* is the concept expressed in its title, which is also the heading for the book's first chapter, written by Mr. Peterson. Mr. Peterson points out in the beginning the hesitancy and uncertainty of our American metropolis, despite its tradition of boosterism, and, recalling Horace's fable of the town and country mice ("Better a thrifty condition and happiness than wealth and discontent"), concludes that "even greater and more persuasive than material security is the desire for spiritual peace." From there he proceeds to a discussion that one is reluctant to summarize, hoping, rather, that any prospective reader of a summary might instead read the whole. For centuries, he says, man has boasted smugly about "conquering the wilderness," and then Mr. Peterson declares:

"No more erroneous or short-visioned concept was ever foisted upon humanity. When man tries to fight nature, he invariably loses. Nature inevitably wins. It is only when man is wise enough to live with nature that he really gets anywhere, regardless of any spectacular social gains he may seem to have achieved. . . . It is when man has most exuberantly used his favorite instruments—the plow and the axe, dynamite, the spade and the pick—that he most rapidly and surely guarantees that the desert will march back against him and leer at him over the ghastly remnants of what he calls civilization. He may build dams to create vast artificial lakes, but, if he fails to cooperate with nature and treat the watershed properly, she immediately sets to work to fill them up with silt, washed off the land because of the plow. Even as he gloats over his power, manifested in great batteries of hydroelectric turbines, nature has already defeated him, though he may not know it. It is because he has tried to defeat the wilderness."

Mr. Peterson thus poses the question: "Can we wrench our thinking into the realization that learning to live with nature is even more important in the long run than learning to live with each other? Are we big enough to contain both the wisdom of primitive man and the wisdom of modern artifice?" For thousands of years, as he reads history, the human race has dreamed of the ideal *social* system as the "criterion and predicate of a perfect design for living." Yet new "and sometimes embarrassing" scientific facts show that "even though the social ideal holds its importance, there is something infinitely more important. That is, learning to live in harmony with nature and the natural world."

In considering cities, therefore,—a prime characteristic of our society—Mr. Peterson and the dozen writers whose essays he has so effectively assembled take as their "point of departure" the thesis that "natural or rural life is the inescapable norm." The book then, in its own best summarizing words, "seeks to present facts, together with conclusions of eminent authorities in their respective fields, which argue for the decentralization of cities. Underlying all these indices—sociological, economic, logistic, architectural, moral, or psychological—is the one basic fact of ecology—the science of the relation of any given organism to its environment."

It is accordingly Paul B. Sears' essay on "The Ecology of City and Country" that seems to be the distinctive discussion of this volume—an essay that might well be among the readings to which every high-school student might be exposed, for it deals convincingly and lucidly with facts of basic importance and it relates them to a responsibility that every citizen should sense. It is a responsibility that arises from the fact that, as Dr. Sears puts it—

". . . we are custodians of ourselves and of our environment as well. We did not make and cannot change the laws under which we must work, but at least we can understand them. That understanding is one of the most serious duties of our culture."

Next in distinctive importance is probably a discussion of "Biological Truths and Public Health," by Dr. Jonathan Forman, a practicing physician as well as editor of *The Ohio State Medical Journal.* Yet the total strength of the book is in the visualized sound application of its basic concepts to specific

To the Goldenrod

By JOHN H. FIREY

When hum of busy insect life is heard no more,
When bloom of spring and summer flower is o'er,
When grow the fields and meadows brown and sere,
Token of the closing year,
Thou alone remain, rarest gift of God,
Last of autumn's flowers—sweet goldenrod.

features of our society—from architecture to economics and population problems, from household conveniences to morality and personal individuality—for the volume is actually the creation of a variety of specialists all arriving at the general conclusion that the city as we know it should be a point of departure in our future development. Among the contributors are Warren S. Thompson, director of a foundation for research in population problems; Henry L. Kamphoefner, a professor of architecture; Louis Bromfield, friend-of-the-land and novelist; Ladd Haystead, farm editor; and the Rev. Roy L. Smith, editor of a church paper. And at the end there is Mr. Peterson again to make it plain that this symposium is no blueprint for Utopia, "no promotional tract for any cult or ism," but rather a corrective for modern thinking and a guide toward a development that is truly practical.

The saga of business, the legend of efficiency, the cult of statism, and the myth of the farm as a service station are "items of folklore" that have crept into our thinking, Mr. Peterson says. Along with these he places "the theorem that, if large aggregations of specialists are good, larger and larger aggregations, to an infinite degree, are still better," and "the failure to differentiate between durable satisfactions and sensory or neurotic stimuli as goals to be attained." Finally he characterizes the attitude of his entire volume by advocating the golden mean, "granting full credit to the splendor of human invention, imagination, and acquisition of special skills," yet deploring a "bumptious fight against nature."

Cities Are Abnormal surely merits thoughtful and wide reading. It makes it plain that man is a member of an interdependent community of all the life on the earth, and it applies this understanding to the specific concerns of men in their daily comings and goings.

Narcotics and Drug Addiction. By Erich Hesse, M.D. Translated by Frank Gaynor. New York: Philosophical Library. 1946. 219 pp., with bibliography and index. $3.75.

Cities Are Abnormal. Edited by Elmer T. Peterson, with contributions by the Editor, Louis Bromfield, Jonathan Forman, Ladd Haystead, Henry L. Kamphoefner, S. C. McConahey, H. C. Nixon, J. J. Rhyne, Paul B. Sears, Roy L. Smith, Warren S. Thompson, and Paul L. Vogt. Norman, Okla.: University of Oklahoma Press. 1946. 263 pp. $3.

Weather

The Weather. By George Kimble and Raymond Bush. New York. 1946. Penguin Books, Inc. 192 pages. Illustrated. $.25.

This is a popular treatment of what goes to make weather and will help the individual to be his or her own weather prophet.

Philippine Birds

Birds of the Philippines. By Jean Delacour and Ernst Mayr. New York. 1946. The Macmillan Company. 309 pages. Illustrated. $3.75.

Latest in the Pacific World Series, this book covers 450 species of birds to be found on the islands of the Philippines. It is a practical guide to the avifauna of the region, and a simple key is provided. The collaborators in the production of this volume are both distinguished ornithologists who have collected widely and studied the birds of the Orient and Australasia. There are few positive by-products of war, but conflict in the Pacific has brought about the publication of this splendid series of books, and *Birds of the Philippines* maintains the standard set by predecessor volumes.

Garden Insects

The Gardener's Bug Book. By Cynthia Westcott. New York. 1946. The American Garden Guild and Doubleday and Company. 590 pages. Illustrated in color and line drawing. $4.95.

This book would seem to be essential for any gardener's library, and certainly the solution of what to give a garden-minded friend as a gift, for Christmas or otherwise. In a word, this volume discusses one thousand insect pests of the garden and their control. Besides the clear and comprehensive text, thirty-eight color plates illustrate one hundred species of the more pestiferous insects, enabling the reader readily to identify them and apply the control measures indicated. Eva Melady contributed these plates, while she and J. E. Edmonson collaborated on the hundred line drawings that supplement them. Within the covers of this well-arranged book lie the answers to many questions that most gardeners have asked when confronted by insect depredations. Going through the volume one wonders how we are able ever to grow anything to maturity, but the advice in the book will aid more of us to do so.

Conservation Bulletin

"Fish and Shellfish of the Middle Atlantic Coast" is the title of Conservation Bulletin No. 38 of the United States Department of the Interior. It is written by Rachel L. Carson and is available from the Superintendent of Documents, Washington 25, D. C., for ten cents. This bulletin is one of a series by Miss Carson, the others being "Food from the Sea; Fish and Shellfish of New England," Conservation Bulletin No. 33 ($.15); "Food from Home Waters: Fishes of the Middle West," Conservation Bulletin No. 34 ($.15); "Fish and Shellfish of the South Atlantic and Gulf Coasts," Conservation Bulletin No. 37 ($.10). All should be ordered from the Superintendent of Documents.

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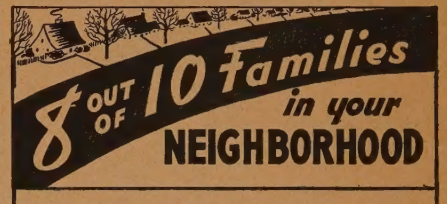

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Lake Erie Park Plan

All the States bordering on the Great Lakes, except Ohio, have at least one lakeside park area. The Burroughs Nature Club of Willoughby, Ohio, has set out to do something about it, and a bill has been introduced in the legislature to this end. Long study indicates that perhaps the best wildlife area left on the shores of Lake Erie is to be found in the beach and marsh at Mentor Headlands, in Lake County, not too far from Cleveland. This includes a large waterfowl haven, and on one May day 115 species of birds were listed for this area. The Mentor Headlands is really a large "island" with the lake in front, and the marsh a half-mile back and parallel with the lake, extending from the Grand River to the fine harbor formed at the mouth of that river. It is felt that this could be created into a State Park of several hundred acres, and would be an area that would appeal to varied types of interest. Setting aside the region would not affect any land useful for agriculture or other economic purposes.

Dartmouth Forest

Special survey of the Dartmouth College Grant, a 27,000-acre forested tract in northern New Hampshire, will soon be undertaken as a part of a coordinated forest survey of the Northeast, and through funds made available by the Charles Lathrop Pack Forestry Foundation. It is hoped to make the college property a source of continuing income from the sale of forest products, as well as a well-managed wildlife area. In offering assistance to the College, Randolph G. Pack, President of the Foundation, pointed out that it is in line with a policy that has made it possible for several other colleges to own and operate their own forests.

Tropical Plants

In May the *Journal of the New York Botanical Garden* published the second in a series of articles under the title "Tropical Plants the World Around", written by Otto Degener. Many of these plants grow in sub-tropical United States, and under glass in colder climates. The products of many of them reach the coldest regions as ornamentals, vegetables, spices, medicines, precious woods, dyes and other articles used in everyday life. Reprints of these two articles are available at twenty-five cents each from Mr. Degener at Poughquag, New York, and he is also interested in learning whether there would be interest in additional pamphlets, or in a book in which the material would be assembled. Mr. Degener is also author of the 333-page book, *Plants of Hawaii National Park*, which contains more than 100 plates and sells for $2.50.

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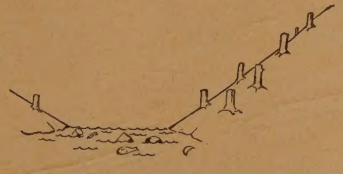
Contents Noted

OUR RECENT quotation of a member of the Sierra Club, who feels that "conservation" has become a somewhat amorphous word for which a substitute might well be found, brought some interesting comment. Our friend Lewis Radcliffe suggests "Waltonism"—as might be expected from a vice-president and long and loyal worker in the Izaak Walton League of America. Lew points out that Ike Walton was not just a fisherman, but that, as Lowell said of him, "he loved the beauty of holiness and those ways of taking and spending life that make it wholesome for ourselves and our fellows." Lew regards "Waltonism" as the husbandry of our natural resources. Husbandry, in turn, is defined as "care of domestic affairs, domestic economy, domestic management; hence thrift; frugality; wise management." This, it strikes us, makes husbandry a good word in its own philological right. And another reader suggests "thrift", which is certainly what we must practice with our natural resources. Any more suggestions?

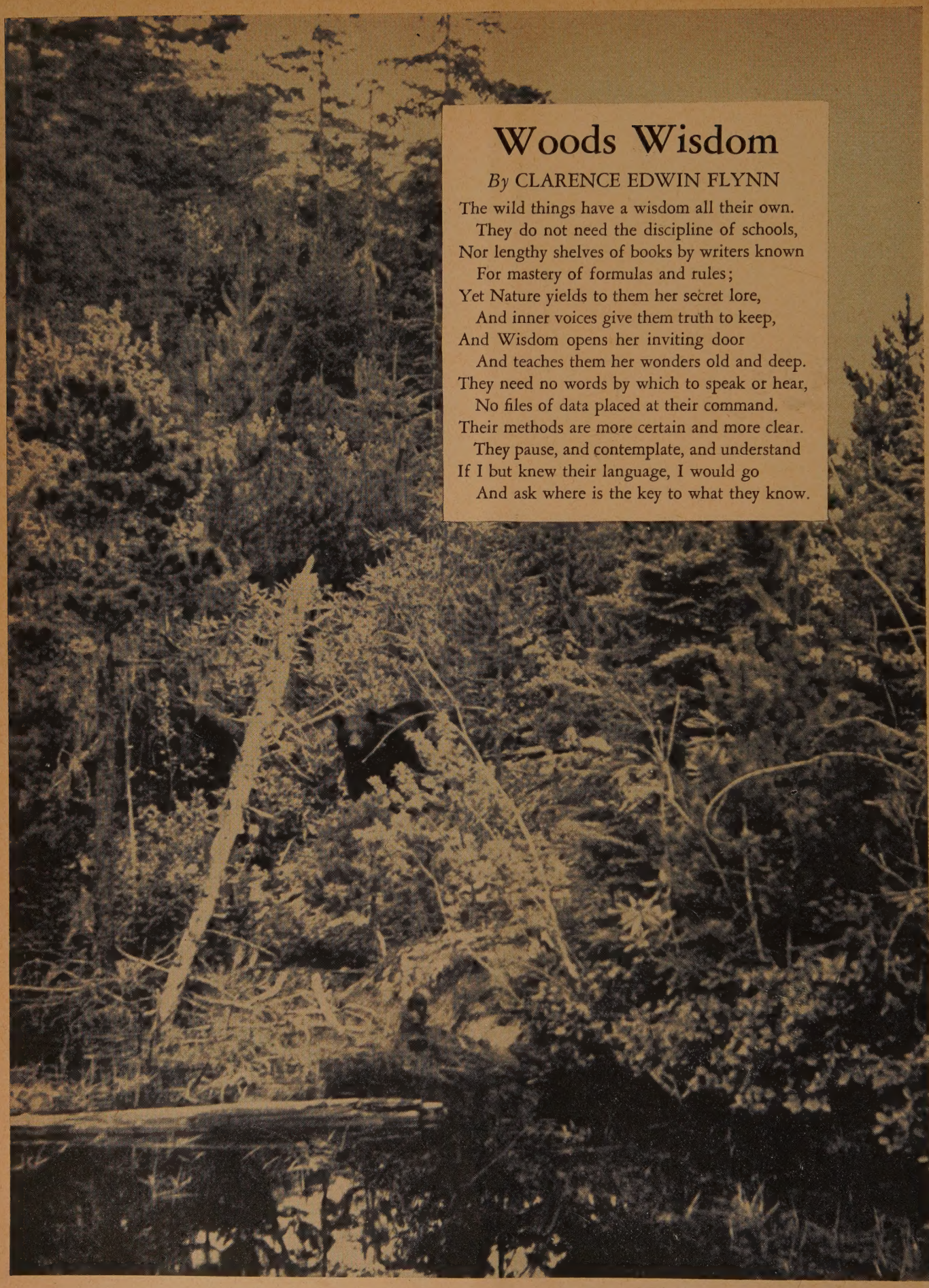
IN ITS issue for September, 1846, *Scientific American* said: "That remarkable man, Humboldt, has reduced it almost to a demonstration, that the streams of our country fail in proportion to the destruction of its timber." This refers, of course, to the great Friedrich Heinrich Alexander von Humboldt, whose realization of the interdependencies of the forces and parts of Nature more than a century ago gave us a chart for the management of our natural resources. This was based on no armchair theory, but on amazing travel and study. Yet even today, with the glaring evidence of a century of abuse of these resources before us all, selfish interests continue to sabotage those streams, and our Congressional guardians of America refuse to face the facts of dire pollution of the waters of our Nation.



SOCIETY OF American Florists goes to considerable effort to advise us that the week of November 3 to 10 will be National Flower Week, "to acquaint the public with the beauty and sentiment of flowers as well as the many interesting and little known facts about their growth and development." We received a considerable booklet with all sorts of things about flowers, from poems to advice on flower etiquette for weddings. Under "Flower Uses" we learn that "tiny rosebuds or other small flowers tied with ribbons to radishes make an interesting hors'd'oeu'vre (sic) dish" and that "flowers may be frozen into ice cubes to provide a delightful garnish for cold drinks." Under "Fascinating Facts" we discover that men prefer to raise dahlias or roses more than all other garden flowers; that gladioluses grow wild along the shores of the Mediterranean; that roses used to be used in mattresses because they were so sweet; that the castor bean, from which is extracted castor oil, belongs to the same family as the poinsettia. We'll take our radishes without rosebuds, our ice cubes translucently pure, and the poinsettia instead of the castor oil, but we are happy to salute Flower Week because we certainly love flowers, if not the size of the florist's bill that comes along later.

IN THE official publication of the Webster Groves (Mo.) Nature Study Society, Espy Jay—which sounds to us like a pseudonym but may not be—reports that things are coming to a pretty pass in the world of the wild. Seems that a bluebird took possession of a rural mail box near Union, Missouri, and laid four eggs in it. The letter carrier regarded this as proper, since the bluebird is the State Bird and thus entitled to privileges. But when letters were placed in the box the bird promptly picked them up in its bill and tossed them on the ground, which constitutes tampering with the United States Mail, a Federal offense. And from New York comes report of a pet monkey who gave birth to twins, losing one. The bereft mother promptly abducted the child of another monkey, belligerently refusing to surrender it, which constitutes felonious monkeynapping. We suppose these offenses will be charged to post-war let-down in morals and ethics.

FROM Los Angeles a reader sends a newspaper clipping with a three-column picture showing Hal Roach, of movie comedy fame, proudly displaying a dead blue heron. The bird, it appears, had been poaching on a pool in the grounds of the Roach home, eating the goldfish. Such pools are, of course, just bait for birds that like fish in their diets, but the heron is a bird of many valuable habits, besides being extremely interesting. One live blue heron is worth all of Mr. Roach's goldfish, rare or not. R. W. W.



Woods Wisdom

By CLARENCE EDWIN FLYNN

The wild things have a wisdom all their own.
They do not need the discipline of schools,
Nor lengthy shelves of books by writers known
For mastery of formulas and rules;
Yet Nature yields to them her secret lore,
And inner voices give them truth to keep,
And Wisdom opens her inviting door
And teaches them her wonders old and deep.
They need no words by which to speak or hear,
No files of data placed at their command.
Their methods are more certain and more clear.
They pause, and contemplate, and understand
If I but knew their language, I would go
And ask where is the key to what they know.

PHOTOGRAPH BY O. W. NEEMELA

Back—or Forward—to Nature?

By ALEXANDER F. SKUTCH

WHEN I settled on a farm at the edge of the wilderness in Costa Rica, I did not look upon this move as a "Back to Nature" experiment. As a naturalist working in tropical countries, I had already lived under primitive conditions long enough to forecast with fair accuracy the kind of existence I should lead on the farm, and how I should react to it. Life in the wilderness had its attractive points, but also many sides not so agreeable. These I shrank from and would have avoided if I could. Still, I wanted independence, leisure to pursue my studies of Nature and to write about them, an outdoor life—and this seemed the most practicable way to attain my desire.

I was also familiar with the reports of others who had tried the experiment of living close to Nature, particularly that of Thoreau. After I was well settled on my farm, I made a mental comparison between my situation and that of the philosopher of Walden Pond a century earlier. Thoreau went to dwell in the woods because he wished to simplify his life, to hold communion with Nature, and to accomplish a specific task, the writing of a book. My own objectives were much the same. Thoreau planned to stay for only a couple of years and made himself a rough hut with the boards from an Irish laborer's shanty. I expected that my sojourn would be much longer, so I hired carpenters to build the most comfortable dwelling that slender means and difficulties of transportation would allow—a house that my rude neighbors seemed to look upon as little short of palatial, although it was crude enough by the standards of more cultivated communities, lacking the most elementary conveniences. Thoreau planted a patch of beans and provisions on borrowed land, and worked it with his own hands. Although I bought my farm chiefly for the forest that grew on it and the river that bordered it, I acquired—and this is what chiefly I was obliged to pay for—a few acres of sugar cane, a little plantation of coffee, a grove of bananas, orange and lemon trees, and far more pasture than I wanted. Since so much hard-earned cash went into these things, it seemed no more than prudent to try to derive some income from them. Accordingly, I needed laborers to help me work the farm. Thoreau dwelt alone and apparently prepared most of his own food, but he could buy meal or flour, shelled rice, and many other things that I could not obtain, or only at too high a price. Here in the backwoods, where corn had to be ground, and rice shelled, by hand, where beans would hardly soften with less than two hours' boiling, the preparation of food was so time-consuming a task that I needed a cook.

This is, we are certain our readers will agree, a significant and thought-provoking article. Its author, Dr. Skutch, shown below astride his horse as they ford the Rio Sonador in southern Costa Rica—is both naturalist and philosopher. He also has rare dominion over the written word. In this penetrating story of what it means to go back—or forward—to Nature Dr. Skutch writes from personal experience, and with frank and valuable objectivity. We believe that what he has to say is eminently worthy of its first position here.

On the material side, I seemed to have the advantage over Thoreau, if being responsible for a larger establishment can properly be considered an advantage. But considering less tangible values, Thoreau's situation was in many respects preferable to mine. Walden was within a short hour's walk of Concord, then a brilliant center of literary and intellectual activity, and, moreover, the home of his family. My nearest village was some eight miles distant, over a rough and rocky road, uphill and down, through muck and mire, over bridges that often trembled alarmingly beneath my horse's weight. I must ford mountain torrents that rose so rapidly beneath the afternoon downpours that, through much of the year, I

Palm-thatched school in a wild part of southern Costa Rica. Elementary education is compulsory, and the government tries to provide schools for all children, but many families live in spots so remote that children cannot attend school. In the wild schools may be primitive.

was never quite sure when I set forth in the morning whether I should be able to return home that same day. And San Isidro, a backwoods trading center that during the construction of the Inter-American Highway acquired many of the unsavory characteristics of a boom mining town, was to Concord as Sparta to Athens. I had no relative within two thousand miles or so. Thoreau could hold intercourse with his friend Ralph Waldo Emerson; Emerson could talk to me from the printed page, but could not answer my questions. Thoreau could borrow books from the well-stocked library of Harvard College. So many rough miles separated me from any source of books that I needed a small library of my own.

But in one respect I would not willingly have changed places with Thoreau. I enjoyed the grander prospect. My dwelling looked upon the highest peaks in the country—giant mountains rising above tropical forests to bare and craggy summits 12,500 feet in the air. The woods beside my house, with their towering trees, graceful palms, spreading tree-ferns, and orchids of many kinds, were far more beautiful than the second-growth pines and hickories about Walden Pond. The birds and butterflies that flew among them were of brighter and more varied hues than those he knew in New England.

Within less than a year after I bought my farm, the Western Hemisphere became involved in the second World War, and, as a result of increasing difficulties of transportation and communication, I was thrown back upon Nature and my own resources to a far greater degree than I had anticipated. Friends who I had hoped would visit me and help to study the life of the forest were unable to come. Soon tools and supplies of all kinds became difficult or impossible to obtain. Since I was just beginning, there were many essential articles that I still needed; I had not even a garden hoe or a rake, and could not get them. Before long it was hardly possible to find rivets for mending broken harness, or wire to put together a dilapidated cooking pot. New ones were hardly to be bought at any price. For a short while, as on a month's camping expedition, it is a valuable and stimulating experience to be cut off from outside sources of supply, and to test our own skill and ingenuity in improvising what we need from what the forest provides. But these makeshifts are rarely so satisfactory as factory-made articles, and to be dependent upon them for long periods is irksome as an unnecessary waste of time and effort.

From the first, even more distressing than the scarcity of equipment was the difficulty—almost the impossibility—of obtaining accurate information about anything; of finding people with skill or training for any task whatever, except perhaps those rough labors performed with axe or machete. Those of us who grow up in a community where, for a reasonable fee, we can command nearly all the knowledge and all the skill that sixty centuries of art and science have accumulated, can hardly realize what it means to be cut off from these advantages. Whether I needed to survey a farm, dig a well, draw up a contract, plaster the walls of my house, or cure a sick animal, it was scarcely possible to find anyone who had the necessary experience and could do these things in a competent fashion. Not that there was an absolute lack of people who pretended to perform these services, for there was no small demand for some of them in the community. Accordingly farms were surveyed, in a woefully inaccurate manner, leading to nasty disputes between neighbors. Wells were dug—and struck rocks that nobody knew how to penetrate. Ambiguous contracts were drawn up between illiterate people who had no notion of contractual obligations—and bad feelings ran high. Cattle became sick and were subjected to barbarous treatments that finished them off in a hurry.

During my first year on the farm I bought a milch cow, which before long gave birth to an unusually pretty calf that I named Io. When Io was a sturdy heifer not yet a year and a half of age, she suddenly began to languish, apparently as a result of the bite

Here is the farm and home Dr. Skutch has established for himself in southern Costa Rica. His house is seen in the center. It is from this spot that his several fine articles on Central American wildlife have come to us, and, most recently, this immediate story.

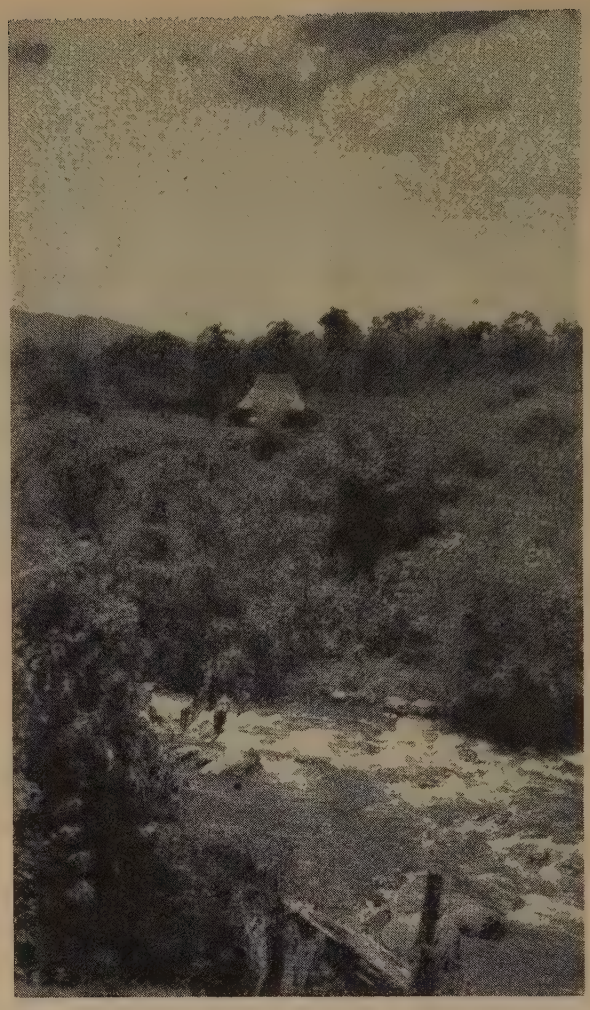
of a vampire bat that had inoculated her blood with the germs of some infectious disease. Day after day she grew feebler. To have brought a veterinarian from the distant center of the country would have been prohibitively expensive, and he could hardly have arrived in time to save her. There was nothing to do but ask the neighbors who raised cattle what ailed my heifer and what remedy to apply. Some of the explanations of her malady were ludicrous; some of the treatments that were suggested savored of the medicine of the twelfth rather than the twentieth century. Both diagnosis and remedy were wide of the mark. So Io died most miserably and was buried; and less than two months later Pandora, her mother, went the same way. I thanked my stars that, having no wife or child, I could not be called upon to stand helplessly by and watch them agonize in a similar fashion.

Meanwhile, I had been in correspondence with the chief veterinarian at the Agricultural College, far off over the roadless mountains, and had learned the name of the infection to which my cows had succumbed. It was exasperating to have lost two fine animals from a disease so readily prevented and not at all impossible to cure—if one knows what to do and has the facilities. To forestall further losses, it became advisable to vaccinate the horses, the two oxen, and Pandora's little orphaned calf. Since there was no one within miles upon whom I could call to make the injections, I perforce had to do this myself. To inoculate an animal with five cubic centimeters of bacterin calls for neither long training nor great skill. Yet, as with all other apparatus, there are little details connected with the use of a veterinarian's syringe that the novice is apt to overlook—with lamentable results. It is grand and noble to blunder along for five years, or ten, or an entire lifetime, in the effort to invent a new machine, or perfect a process useful to mankind. But to bungle an operation that thousands can perform with ease and skill makes one feel stupid, ineffectual, unprepared.

But perhaps the most cogent answer to the question of whether we wish to go "Back to Nature" is provided by the contemplation of people who long ago went back, and have for generations lived under fairly primitive conditions—my neighbors, for instance. Whether one considers their minds or their bodies, they are not an attractive race. Taken as a whole, they are undersized, poorly proportioned, have bad teeth and uncomely features. About half are illiterate, and an amazingly large proportion of them were born out of wedlock. Although nearly devoid of religious feeling, they perfunctorily keep all the numerous holidays of the Catholic Church, without having any conception of their significance. Their wedding feasts usually end in drunken brawls, and their funerals are hardly more decorous. They know scarcely anything of the history or traditions of their country. They find it at least as easy to lie as to tell the truth. They have neither books, games nor music to occupy their leisure, but spend the long, rainy afternoons sitting around in their thatched huts, spitting on the floor, and repeating ugly gossip about their neighbors. The more intimately I penetrate their minds, the more nauseated and alarmed I become with what I glimpse there. Avarice and envy, malice and hate seem to be the chief driving forces of many of them. Some pass as being more clever than others, but theirs is a huge stupidity thinly covered by a low and catlike cunning. They make helots of their children, who, far from exhibiting the innocence, trustfulness and joyful abandon in play which are the charm of childhood, are shrewd little imps who can bargain with the best, and at the age of twelve or fourteen know all the tricks of the trade —nearly all that they ever will know. This is a general picture of a population very mixed as to race and antecedents. A few individuals are distinctly superior to it, but on the whole I believe that it is a true picture.

However it may be with animals, with their often complex, highly-developed, innate patterns of behavior, everything there is of nobility in the character

of man comes through culture, through the cumulative efforts of many generations to improve themselves and their offspring. Only thus are his wild, unruly, selfish passions tamed and mitigated. Perhaps the one purely innate characteristic in which man can justly claim superiority over other animals is his greater capacity for education. We are what our parents and teachers and ourselves have made us. We must slowly raise ourselves above the mire through our own stern efforts toward self-discipline. It is pleasant to believe that we come into the world "trailing clouds of glory"—perhaps. But a truer allegory of human life is of the seed that falls into the mud and slowly, precariously sends a green shoot up into the sunlight. The traditions, the disciplines, the institutions that help to mold a noble human character are not found amid the forests. Perhaps the most admirable characteristics that are spontaneously fostered there are *endurance* of hardships and *patience* under adversity, both of which are needed.



The Rio Pena Blanca flows in front of the author's home, and across the stream is a neighbor's ranch.

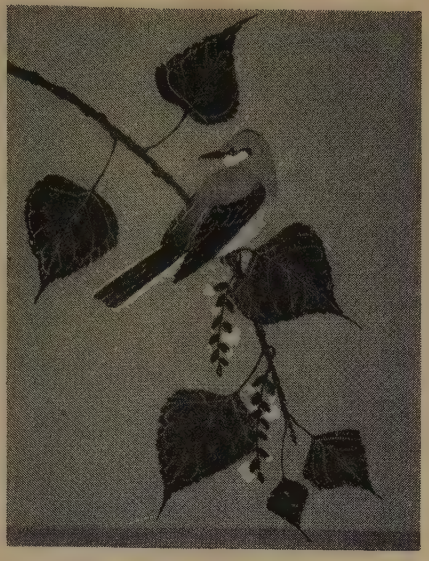
Would we, then, go "Back to Nature"? How far back would we go? To pioneer ancestors of a few generations ago, who lived on intimate but by no means friendly terms with Nature; whose chief study was how to destroy her; who burnt the forests, wore out the soil, annihilated the passenger pigeon and all but exterminated the beaver and the buffalo? Or would we go farther, to the Old Stone Age, when our remote forefathers dwelt in caves, covered themselves with skins, and crept through the forests in mortal fear of the wolf, the sabre-tooth tiger, the mammoth, and their neighbors of other tribes—to a period without books, without science, with only the first rudiments of art? Or would we return yet farther into the mists of past ages, to those ape-like anthropoids who are supposed to have dwelt among the tree-tops much in the fashion of monkeys—which I have never considered the happiest or most highly endowed of wild creatures? Perhaps the prospect would be more attractive if we could, by reversing the process of evolution, return to a condition resembling that of the song-birds, with their perfected instincts and clean, free life amid the trees, the sunshine and the flowers. But we can never "return" to a condition of life resembling that of the birds, because we never passed through a corresponding stage of development. Doubtless, if we trace the ancestry of men and of birds back far enough through the aeons of geologic time, they converge upon some primitive vertebrate stock. But since that inconceivably remote epoch, both men and birds have come a very long way, and by widely divergent roads.

Yet in this tortured modern age we badly need to draw nearer to Nature. We need to refresh our souls with the beauty of Nature, the outward calm of Nature, the apparent simplicity of Nature. We lean too heavily upon each other, and each man finds his neighbor a frail and undependable support. It is more salutary to lean upon Nature, who is often cold and severe, but rarely treacherous or deceitful. We have become more anthropocentric in our thinking than any preceding era of which a record has been left. Earlier ages enthroned gods of human form in the skies above; now we make gods of ourselves, and can find no sanction for morality or religion apart from our own more or less selfish desires. Nature will teach us that we are only one among her many children, and perhaps not her best-beloved.

If we need to draw nearer to Nature, yet would not go back to her, the alternative seems obvious—we must go forward to Nature. To go back to Nature would entail the abandonment of all our hard-earned conquests of culture, art, science, law, philosophy and technology. To go forward to Nature, we shall need all that we have in these fields—and a good deal more. Uncultured people can hardly walk through the woods without leaving ugly tell-tales of their destructive passage; with growing culture, we learn to love the wood-rose, yet leave it on its stalk. As ornithology advances, naming the birds with a gun gives way to the neater and more satisfying method of naming them without a gun. The more that science teaches us of Nature's secrets, the more stimulating and rewarding do our contacts with her become.

As the applied sciences are perfected, they approach nearer and nearer (Continued on page 498)

The lark sparrow is a strikingly marked bird, black and white with a dark spot on its breast.



Thomas Say found and named the Arkansas kingbird, a common bird of the western plains.

Lewis and Clark discovered the western tanager; Wilson drew and named it Louisiana tanager.

The Bird Explorers

By VIRGINIA S. EIFERT

Illustrated by the Author

SINCE THE days when the people of Raleigh's colony settled on the sandy shores of Roanoke—since the Pilgrims came to Plymouth and Duxbury and Provincetown—men, with unending enjoyment, have been discovering and naming the American birds. At first, perhaps, it was only a casual looking at them. The settlers were homesick for England, and in certain American birds they saw a resemblance to those they never expected to see again. So they called them by the familiar English names, and set down for posterity certain ornithological errors that have persisted ever since. They called our big, russet-breasted thrush a robin; our finches sparrows; our small falcon a sparrow hawk. They named our redwings and grackles "black birds," although English blackbirds are thrushes, and American blackbirds are orioles. But the greater number of birds lived wild, free, and unnamed throughout the tremendous continent that bulked behind the little colonies on its eastern shore.

Swainson's hawk was named for the naturalist, William Swainson, by Prince Charles Lucien Bonaparte, brother of Napoleon.

As civilization became less of a gamble and more of a certainty in America, English and French naturalists, eagerly delighted to explore virgin territory, began to track down and name multitudes of strange birds. At that time there was no systematic method of determining names. There were no standard authorities; no books on American birds; no check lists. The early ornithologists were on their own in a brave, new field. They made many mistakes; confused female birds and immature birds with new species; recorded birds that never were seen

Magpies were found in the Rockies by the Lewis and Clark expedition of 1804-1806.

Alexander Wilson discovered and gave a name to the lovely little blue-headed vireo.

Since the days of Mark Catesby, the Carolina wren has been well known in the East and South.

again. Yet, in spite of errors, one by one the American birds were discovered and added to the growing list of species for America.

One of the earliest of the naturalists was the Englishman, Mark Catesby, who lived in Charleston, South Carolina. From 1712 to 1719 he carefully hunted out and named most of the Carolina and Florida birds. Only one, however—the yellow-billed tropic bird, *Phaethon lepturus catesbyi*—bears the name of this pioneering bird-namer.

Yet it was he who first described the cardinal, which he called the Red Bird; he who thrilled at a redstart flashing through the Spanish moss in the swamps outside Charleston; he who had first chance at the summer tanager, the pied-billed grebe, the painted bunting, the red-winged blackbird, the bluebird, and a great many more. Fresh from England, he must have marvelled.

Then, in the middle of the 18th century, a man of science in Sweden revolutionized the scientific field by giving a binomial nomenclature to everything that walked, swam, flew or grew. In his *Systema Naturae*, Linnaeus named the then known American birds, and created a standard by which later ornithologists could agree or disagree. They have been doing so ever since. Linnaeus gave one Latin name for the genus and one for the species, and, when necessary, a third to designate a subspecies. The Swedish naturalist, however, never saw the American birds he named. He never knew the iridescent blue-green-purple of an indigo bunting among wild roses, nor the delight of a brown thrasher singing on an April morning. It was from other men's descriptions, from early drawings and from dead specimens, that he named many of our birds. All those determined by Linnaeus bear his name, or its abbreviation—L.—immediately following the scientific name. His is a potent signature in the history of American birding.

As the 19th century opened, the discovering of American birds became a major pursuit among men of science. Here was a continent the fauna of which was little known. Scarcely anything had been scientifically ferreted out about the birds, mammals, and plants living inland from the better-known coast. And there were some men who could not be content with the laboratory, or with a dried bird skin collected by someone else. They were outdoor birders in whom lay the spirit of adventure and discovery, and to whom the discomforts of primitive conditions were as nothing if only there were birds. These men —from Alexander Wilson and George Ord in the early 1800's, both of whom preceded and overlapped Audubon's work, to the two young men in 1939 who discovered Sutton's warbler—made history as they added bird after bird to the list for America.

Incongruous as it may appear at first, it is peculiarly fitting that the names of men be attached to the names of birds. In each name there is a reason; back of each a story. They are not idle titles; not political gestures. They were the result of hard work, careful study, and exploration in the years between 1800 (some even earlier) and today.

In Wilson's day, spring migration was a feverish time of mad searching for new species. Birds never before classified were snatched from the ancient paths of migration. In this way Wilson found many new birds, among them a large number of our warblers. He found the Nashville warbler near Nashville, Tennessee; found the Tennessee warbler on the banks of the Cumberland; found the Connecticut warbler in Connecticut. The bird list today names many birds for this lonely Scot, who learned the life-histories of more than four hundred birds in the days when little or nothing was in print to guide him

in his work. It is no more than proper that a warbler, a thrush, a plover, a phalarope, a snipe, a tern, and a petrel all should bear his name. Still others are named for his contemporaries—for Audubon, who brought many other birds to light; for William Swainson and for Dr. Bachman of Charleston; for the brother of Napoleon, birdman Prince Charles Lucien Bonaparte, for whom the Bonaparte's gull is named.

Birds of the East were fairly well known when, in the first half of the past century, the wilderness of the West beckoned to the birdmen. When the Louisiana territory west of the Mississippi became part of the United States in 1803, both the government and the bird explorers wanted to know what was out there in the land Napoleon had sold them for $15,000,000. Some folks, however, complained of waste when $2500 was allotted to outfit and sustain the two-year expedition led by Lewis and Clark into the unknown wilderness of the Northwest Territory.

This was the first of the western expeditions that rapidly brought new birds to the list, for when Lewis and Clark followed the wild Missouri up through Indian country to the Rockies, they found new species all along the way. They found the western meadowlark singing its throaty contralto song from the grasslands of Kansas and Missouri up into the fields of paintbrush and pentstemon in the mountains. They found strange, bold, long-tailed, black and white birds that visited the camp and carried off food from under the men's noses, robbed hunters before their game was skinned, and pecked the sores on horses' backs. These were the first magpies recorded by white men in the Rockies. Lewis and Clark found the new Lewis's woodpecker, and in the shadow of Mount Hood, in the Oregon Country, the bird that came chattering and unafraid into the camp was called Clark's crow, or Clark's nutcracker. In the slim, dense spires of white spruces, up where the going was hard and the air thin, the Hopi-colors of the western tanager were first seen. Perhaps, between Indian attacks, was found the Franklin's grouse; they saw the first magnificent whistling swans flying on broad wings below the great narrows of the Columbia. Explorations for birds went hand in hand with exploration of new country.

In those days birding was not a gentle pastime. It was intensive, serious, dangerous, gruelling, and at the same time it was too fascinating a game to give up for easier pursuits. Birding in wild lands was combined with the acute danger of hostile Indians and with the menace of the unknown. It is somehow amazing to picture these men on the government expeditions—Sir John Richardson with the Hudson's Bay Company in the fur countries of northern Canada; Lewis and Clark in the Oregon Country; John K. Townsend and Thomas Nuttall naming birds from Massachusetts to San Diego; John James Audubon traveling, ever bird-hungry, along the Wabash and the Ohio and down to New Orleans and Florida, into the far West, and up into Labrador. Intrepidly, they all braved terrible traveling conditions, even risked death, for the sake of new birds. And they found them. Richardson found the delicate, azure-colored bluebird at Fort Franklin one July day in 1825; Schoolcraft, studying Indians near Sault Sainte Marie, found, on a chilly April day in 1823, the first evening grosbeak. The gabbling, elusive Bell's vireo was cornered in Dakota territory by the Audubon party, which was traveling to the Yellowstone River. Gambel, hearing a scolding and fussing in a field of dead mustard stalks in California, discovered the first wren tit.

Among naturalists like these there were many exchanges of compliments by naming birds for friends.

The first ruddy duck was collected on the Delaware River in the late eighteenth century.

A specimen of the skimmer was sent to Linnaeus in Sweden, for him to give it a Latin name.

Clark's nutcracker was discovered, about 1805, by the Lewis and Clark Oregon expedition.

It was not proper to name one's new bird for oneself. Therefore, when the hitherto unknown solitaire was shot near Astoria, Washington, the bird was brought to Dr. Townsend, who gave it to his friend, Audubon, at that time birding in the West. Audubon described the new bird and gave it the name of Townsend's solitaire, which it bears today. Other naturalists, in turn, named Audubon's caracara and Audubon's warbler for that ardent bird explorer. For Thomas Say, who found the Arkansas kingbird on Long's expedition into the Rockies in 1820, the Say's phoebe was named, and a sparrow, a woodpecker, and several other species were named for retiring Dr. Nuttall. But sometimes men who found new birds determinedly gave their own names to their finds. Prince Maximilian of Wied did this when, in the West, he found a new bird that he labeled Maximilian's jay. Today, however, as if in punishment for this burst of ego, the exploring prince is not represented in the American bird list. His bird was renamed the pinyon jay.

By the middle of the 19th century, still more birdmen went West, some with the Sitgreaves expedition to the Zuni and Colorado rivers, others on the Pacific Railroad expeditions, the Hayden expeditions, on those sent by the Smithsonian Institution, and with certain private exploring parties. Men whose names are now part of the bird list went along as naturalists, and avidly explored a land where Indian attacks still were not only possible but imminently probable. A number of army officers, located on isolated posts, turned birders. Lieutenant Couch found Couch's kingbird; Williamson's sapsucker was named for Lieutenant Williamson; Captain McCown found the vermilion flycatcher in Texas in 1850—McCown's longspur is named for him—and Abert's towhee was named for young Lieutenant Abert of John Fremont's mapping expedition over the Oregon trail.

White pelicans were birds that must have startled as well as vastly interested early ornithologists.

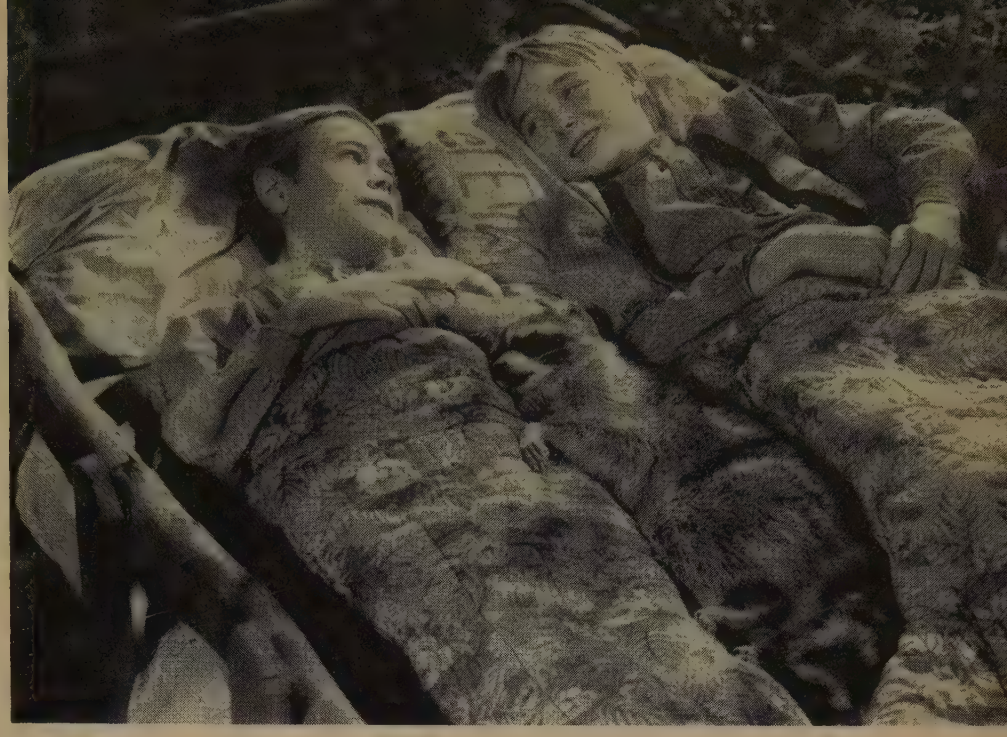
Collected on one of the western expeditions in the middle nineteenth century, the white-throated swift was named by Baird.

Some of the birdmen of the government surveys were Gambel and John Cassin, J. G. Cooper, S. F. Baird, Robert Ridgway, Kennerly of the 35th parallel survey, Elliott Coues, George B. Grinnell, and others, whose names remain as enduring witness to the birds they found. Kennerly discovered the Gila woodpecker in the scorching lands along the mad Colorado. J. G. Bell found the white-headed woodpecker near Sutter's Mill in California, where, along the American River, gold was found. Grinnell's water thrush, Gambel's quail, Cooper's hawk, Cassin's finch. Lawrence's goldfinch, Baird's sandpiper, Bell's sparrow memorialize early naturalists. Dr. Coues named Grace's warbler, which flits and sings in the pines above Grand Canyon, for his sister Grace; MacGillivray's warbler was named for William MacGillivray, an associate of Audubon. Those were exciting days for the birdmen as each canyon and each mountain peak offered the chance of a bird unknown to science.

The years passed. Highways were built into the West. The railroads found a foothold around mesa and through mountain range, all the way to the Pacific. One by one the birds of America were discovered and formulated into the American Ornithological Union's check list, which, year by year, had to be revised by its capable chairmen and board, because of additional discoveries and new knowledge of range of species. But (Continued on page 498)

Animal Stars of "The Yearling"

By JEAN KENT



Male raccoon, a mother in *The Yearling*, gets accustomed to sleeping in a bed.

Out of a jungle of rain-washed pines and junipers spearing the hot blueness of the Florida sky, ran a small, tawny-haired boy. His bare feet, extending from his overalled legs, crackled against the fallen palmettoes. He leaped into the air, flinging his arms toward a flock of white doves circling above him.

"Okay, cut!" yelled Director Clarence Brown.

The camera ceased grinding on a first take of the scene called "Jody and the Doves" in the script of Metro-Goldwyn-Mayer's production of *The Yearling*, on location near Silver Springs, Florida.

A grip man pointed to a full-grown pine dwarfing the shiny row of reflectors that stretched in a semicircle on either side of the camera. "They're holding a council on which direction is home," he explained, squinting his eyes at the doves. Released from a cage for use in the scene, they now huddled in the upper branches of the trees, unwilling to act.

The director wanted another take, and the take required doves. Stand-ins, grip men, prop men, cameramen, and cast were called in. Collecting around the base of the tree, they attempted, by a mixture of pleas, commands and shinnying, to retrieve the winged actors. After fifteen minutes of this futile effort, Brown slapped his sun helmet sharply against the side of his knee. The crew disgustedly shuffled back into position, and Ralph Stockman, M.G.M. animal trainer, substituted brown doves for the white ones cooing happily in the pine.

This interlude was a sample of the many unique problems that arose in the filming of this multi-million-dollar production. Primarily an animal picture, *The Yearling* tells the story of the boy Jody and his pet fawn, Flag, who grow up on an "island"—native term for farm clearing—surrounded by the wildlife of the Florida scrub pine country.

In addition to doves and a fawn star, actors in this film include the usual horses and dogs. Bears, pumas, buzzards, owls, raccoons, foxes, fox squirrels, redbirds, rattlesnakes and an alligator appear, making and, occasionally, breaking scenes with equal abandon. This impressive list of wildlife would disconcert most animal trainers, especially if their problems are complicated by the Hollywood habit of last-minute demands for a fawn that can drink milk out of a pail, or a raccoon that will scale a tree at the

Trainer Morgan and Gregory Peck congratulate some of the deer, which star as "Flag" in the motion picture, on their acting. Several deer of various ages had to be trained to take the part of "Flag," and to do many of the special things required of Jody's pet.

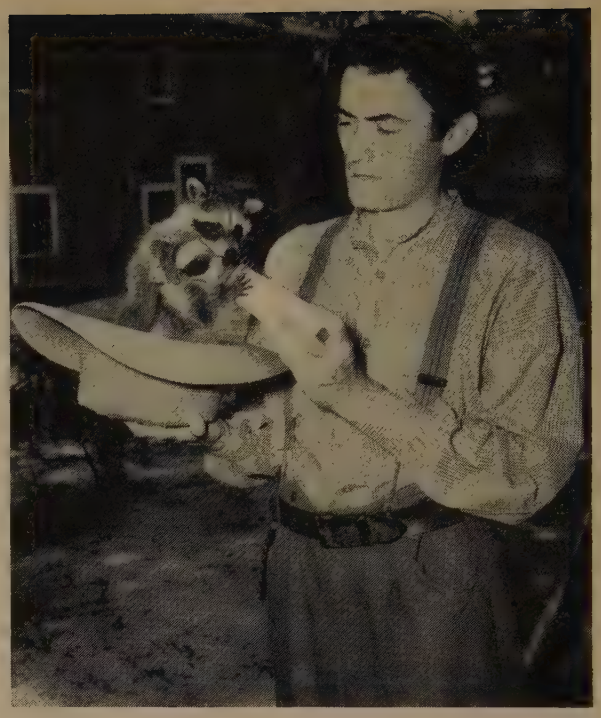
drop of a director's hand and with cameras grinding.

But Morgan, M.G.M. behind-the-scenes trainer, is not easily upset by unexpected Hollywood demands. Having served apprenticeship as a Merchant Marine sailor on ships transporting live cargo, and as Barnum and Bailey elephant trainer, he has developed his own peculiar brand of animal insight.

Deer and fawn scenes in this picture presented the biggest challenge. To furnish the required supply of actors for these scenes alone, Morgan kept on hand a herd of twenty deer. Ten fawns of various ages were necessary, since the picture script called for shots of the star, Flag, in different stages of growth. The fawns, as they grew older, or turned an off shade for technicolor use, had to be replaced by new ones.

To be prepared for sudden demands on the part of script or director, the animals were taught a variety of unfamiliar actions, which they learned to do naturally and without fear. To give the appearance of coming when called on the set, they were trained to lead on a thread. They learned to lie on a bed and to walk into a house as naturally as though it were a pasture. These actions Morgan taught his deer actors in anywhere from four days to a week.

I made a visit to the Silver Springs Court, housing more than sixty M.G.M. actors and technicians, and approximately the same number of animals, to discover the secret of Morgan's genius. Behind the Court, I found rows of square cages, laid out side by side and containing the smaller animals. The deer section of this two-acre zoo, lying at right angles to the smaller cages, was composed of grassy, wire-enclosed pens. A row of steps led from the grass to connecting barns. Fawns were toddling up the steps,



moving delicately on tiptoe across the barn floor, ears working and tails tucked between their legs.

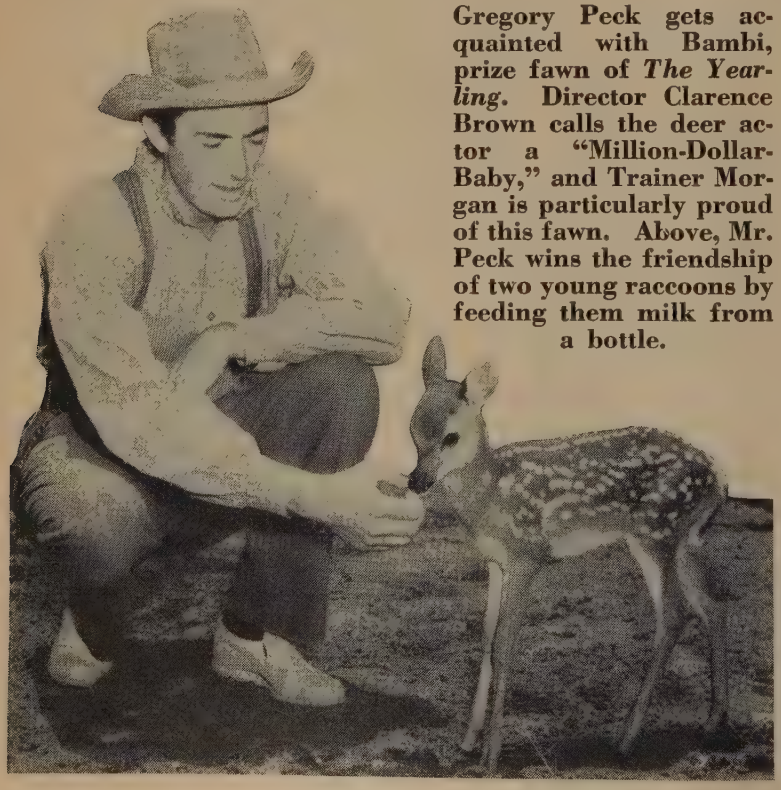
Morgan stood by the feeding table, his tattooed chest bared. One of the fawns ran up to him. It nuzzled its nose into the palm of his hand and bleated. Morgan produced a bottle from a sterilizer on the bench, and the fawn began a tug of war with the nipple.

"Take it easy or you'll get some gas in your stomach, little insect," Morgan cautioned.

Fawns were fed only after mounting the steps between yard and barn, and crossing the barn floor to the feeding table. As the house is the common habitat of Jody's pet, Flag, these fawns had to be early accustomed to wooden floors and steps. Flag, in the book, drinks out of a pail. This created a new stumbling block. Usually a fawn will shy away from anything but a bottle. One fawn named Joe mastered the art of drinking from an artificial container. A shy animal, he did not make the same rush for the bottle as the others. One day Morgan placed a pail of milk in the privacy of his stall. Joe lapped it up contentedly. So he became the privileged actor, appearing in all scenes where Jody is shown feeding the fawn. Morgan's success seems to lie in his philosophy about animals.

"Deer are just like people," he says, "you have to study them individually."

Morgan's greatest pride and joy among his animal actors was the fawn Bambi. Referred to by Clarence Brown as the "Million-Dollar-Baby", Bambi is the star. All other deer and fawns appearing in the



Gregory Peck gets acquainted with Bambi, prize fawn of *The Yearling*. Director Clarence Brown calls the deer actor a "Million-Dollar-Baby," and Trainer Morgan is particularly proud of this fawn. Above, Mr. Peck wins the friendship of two young raccoons by feeding them milk from a bottle.

Claude Jarman, juvenile discovery who plays the part of Jody Baxter in *The Yearling*, feeds the deer, Joe, to gain his confidence. Joe was the one fawn that learned the trick of drinking milk from a bucket.

movie were raised in zoos. Rescued from a forest fire by a ten-year-old girl, who was persuaded to part with it only on a promise of a female fawn to be supplied from Morgan's stock, Bambi, the sole truly wild member of the M.G.M. deer family, was the only really tame one.

When I first saw Bambi, he was strutting up to Morgan for his bottle, tail wagging, head set on his graceful neck as if he were showing it off, inquisitive nose thrust out, and a look of intelligence in his round, starry eyes. Morgan reached over and picked him up. The calf-like legs, which stuck out awkwardly on other fawns when they were lifted from the ground, folded neatly underneath this young deer. Nearly all special tricks and close-ups were reserved for Bambi's talents. He was used for all shots where Jody is shown carrying Flag, and he was the only deer that would come when he was called.

"You see, "Morgan said, nodding at Bambi folded quietly in his arms, head raised, listening to Morgan as if he were a prophet, "Bambi's the right color and the right everything. He's just a natural deer."

Maintaining a group of fawns individually trained to perform a definite set of actions was not the only problem, however. Often a part of the script called for something not a part of the regular repertoire. Movie scenes are shot backward and forward, and animal experts have to have as many tricks up their sleeves as any studio prop man. Before shooting began on the funeral scene of Jody's friend, Fodderwing, trainers were informed that Brown wanted a shot of Flag riding in the funeral wagon. Riding along on a sand-rutted road with harness jangling is enough to startle any fawn. But trainers followed the same realistic method characteristic of the whole production. They rigged and hitched up a wagon and drove Bonita, the Flag for the day, up and down half the night, until a wagon became as much a part of her life as the cot she slept on.

Animal scenes in *The Yearling* were not always "stolen" by fawns. Dogs are responsible for some of the best character acting in the picture. In the bear hunt sequence The Feist, a dog belonging to Jody's father, Penny Baxter, jumps bravely through the thicket after the bear, recoils and backs up, cringing, toward his master. The dog playing the part of The Feist was naturally aggressive. The problem of making him into a coward was a tough one. Seeing the film, one might think that the dog's spirit had been broken, but actually Mack Weatherwax, *The Yearling* dog trainer, turned the animal into a character actor.

Every day Mack drove The Feist to a tangled bay thicket fifty miles from the nearest town, where the actual scene was to be made. He first taught him to jump in and out of the thicket by using a lead. To make him cringe when he hit the ground, Mack threw a hat in front of him. When the animal responded with the proper action, he was rewarded. After several trials, using training properties, the canine actor learned to perform the entire "business" on cue. Mack rehearsed the dog five times every day. Not satisfied with a mechanical run-through of the performance, the trainer required a display of genuine fear in The Feist's expression and movement before he was satisfied with the try-out.

Rip and Julie, the other dogs appearing in the picture, also come in for their share of acting. Julie, in the bear hunt scene shown in the movie, is wounded, must crawl, and then run with paw lifted and allow Jody's father to pick her up, lying limp as though she is hurt. The humane society, represented on every movie set involving animals, prohibits the deliberate harming of any animal. So Julie had to be taught to act the part. Mack bound her leg up, gradually taught her to walk with paw lifted and leg unbandaged. She was properly rewarded. To teach the dog to crawl, the trainer put a piece of meat a few inches from her nose. When she wriggled to-

ward it, he moved it farther away. Gradually Julie achieved a crawling motion. Later she learned to perform the same action without bait and at a gesture of Mack's hand. Both dogs had to be taught to run in the bear-hunt scene, and Rip, naturally faster than Julie, learned to slow down his pace so that she could take the lead. These acting requirements would test the ingenuity of the best of trainers, but, under Mack's careful and patient direction, the dogs learned their parts to perfection.

Although dogs and fawns required the most complex training programs in *The Yearling* rehearsals, some remarkable shots were made of the smaller and less important animal actors. One of the most appealing and beautiful scenes in the entire picture is when Jody falls asleep in the jungle and wakes to find a raccoon and two baby coons drinking from the running brook beside him.

In shooting this scene M.G.M. ran into plenty of difficulty. The particular female raccoon acquired for use in the picture was simply not the domestic type. The only attention offered her cubs was an occasional bite on the ear when their behavior interfered with her peace of mind. The M.G.M. male raccoon was of a different temperament. Forming acquantance with the cubs during zoo play hours, he learned to keep a fatherly eye on their activities. At the time the scene was shot the foster parent was hungry and thirsty. It was exactly the right combination of desires for a remarkable piece of photography.

First looking around to see if he were being followed by his "offspring," the raccoon, his black-circled eyes shining like coins in the bright Florida sun, trotted down a fern-edged path to the brook. Cypress boughs shimmered like black feelers on the water's surface, and the shadows fell across Jody's face. The raccoons paused, noses in air, gazing at the sleeping Gulliver in Lilliputian wonder. Then, with a brush of his bushy tail, the raccoon turned away and began cracking nuts strewn as bait along the edge of the bank by prop men. Father and sons dipped their noses into the stream and drank. "Perfect shot: cutest actors I've ever seen," commented Len Smith, head cameraman.

Of prime importance in production of *The Yearling* was the understanding between the actors, animal and human. For six months before work on the picture was begun, all animals and members of the regular cast played together and learned to recognize one another. Every night on returning from the set Claude Jarman, who plays Jody, fed Bambi his bottle, and Gregory Peck, who plays the part of Jody's father, fed and petted his dogs.

Probably in no other picture has such an assortment of animals worked with actors in so wide a variety of rugged natural settings. But it is this realism—the infinite amount of detailed work, from the training of the animals to the choosing of the sets—the ten days of waiting to get a twelve-second shot—that have made each scene a masterpiece of color, of action, and of natural as well as artistic beauty. The raccoons, fawns and other Florida creatures are more than animal actors. They are *The Yearling*.

★

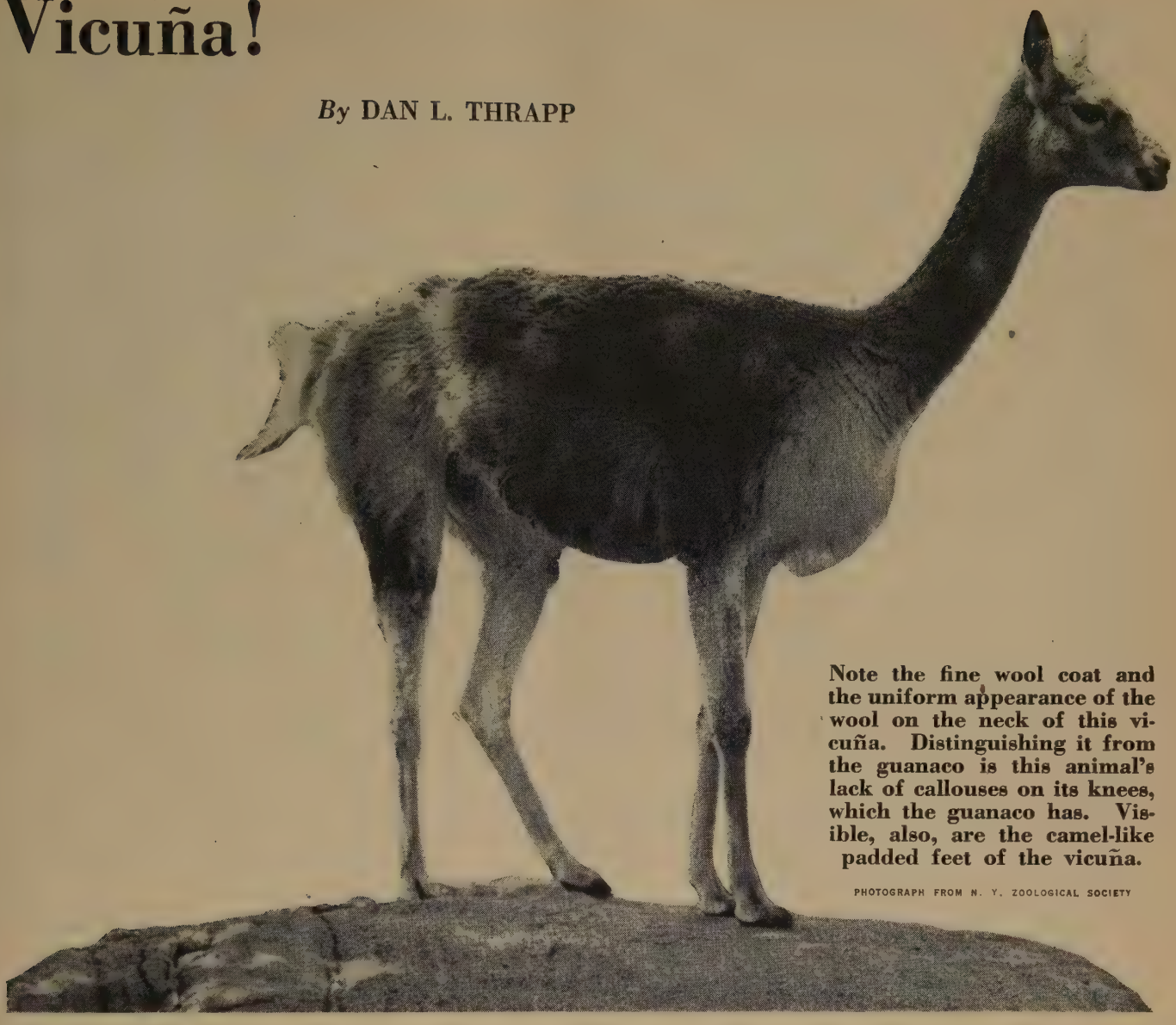
The Wonder Bird

By ETHEL ROMIG FULLER

Mind says: "Ouzel. Period."
Heart: "Here's something lovely-odd;
A bird that's more an elfin squatter,
Staking claims on air and water;
Feeds *under* swiftest streams, though how,
Don't ask me; flies to a bough
Or a boulder; preens gray wings
In the sun, and blithely sings
An aria, unearthly-sweet.
Builds a nest, compactly-neat,
Of alpine mosses on the wall
Behind a plunging waterfall;
Or else close to one. Anyway
It's always misty-pearled with spray.
O Mind, to be less factual . . .
Here's something kin to miracle!"
"Ouzel!" one-track Mind avers.
Heart glances, pool to junipers:
I've seen this day, what I have seen . . .
A bird, both Ariel and Undine!

Vicuña!

By DAN L. THRAPP



Note the fine wool coat and the uniform appearance of the wool on the neck of this vicuña. Distinguishing it from the guanaco is this animal's lack of callouses on its knees, which the guanaco has. Visible, also, are the camel-like padded feet of the vicuña.

PHOTOGRAPH FROM N. Y. ZOOLOGICAL SOCIETY

FOUR graceful silhouettes appeared, as though by magic, on a ridge three hundred yards distant. From where we were they looked like antelopes, except that they held their heads higher and the distinctive pronged horns were not present.

"Vicuña!" breathed Pata Pila, the Argentine Indian who was my driver.

We watched the four animals, and they looked at us. At length they stepped lithely down the slope, playfully broke into a bounding lope and disappeared in great leaps over the turn of the ridge. I hastened to the top of it, wheezing like an ancient Model T, and saw them turn on a burst of speed and run as swiftly as greyhounds up a boulder-strewn mountainside. The altitude of 15,000 feet made exertion of any sort difficult for me; to them the thin air of the high Andes acted as a super-charger.

As I turned to rejoin Pata, a dulled bit of brass caught my eye, and I brought it back to my companion. It was a cartridge case from a high-powered rifle, and seemed to have lain there for some time.

"Vicuña gun," Pata said briefly. "Probably here for ten years. No hunting at least that long."

We drove on, occasionally seeing bands of four to six vicuñas. Once a single animal bounded along the hillside parallel to our route, and Pata pushed our machine up to thirty-five miles an hour, which I thought plenty fast for the bumpy, rocky path that served as a road. But the vicuña was easily going away from us when Pata lost control and we abruptly came to a halt in a ditch. The vicuña had an additional advantage—not only was he faster than we, but his risk of slipping out of control when the going got rough was negligible. I imagine he was considerably amused by our clumsy attempt to penetrate his habitat.

The marvelous grace, the swiftness and agility of these gazelles of the mountains make it easy to understand why the Inca's indefatigable herders could not tame them, although their cousins, the guanacos, are readily domesticated and are probably the ancestors of the Indians' "farm animals," the llama and

A young although nearly fully grown vicuña at Huancayo, Peru. Attempts have been made to domesticate this animal but with only indifferent success.

PHOTOGRAPH COURTESY OF THE AMERICAN MUSEUM OF NATURAL HISTORY

alpaca. The guanaco differs from the wilder, freer vicuña mostly in size and coarseness, but they have similar habits, and the guanaco is found throughout vicuña range, and far beyond.

The vicuña's home is in the more rugged parts of the cordillera, from Ecuador south to northern Chile and Argentina. No point of the Andes was too high for them to roam. I have seen their trails at altitudes of more than 18,000 feet, and have started bunches of them about that high. Usually they run in groups of five to fifteen females with one male, who wins his harem by right of conquest, for the males fight fiercely among themselves. In February, the females have their single fawn, and surely it is the most active baby in the world! At birth it is swift and has the endurance of a mustang. If it is a male, it will be ousted from the parental herd when a little more than half-grown, and herds of twenty or thirty young males are then common. The pads of the vicuña's feet are distinctive, and tracks can often be seen above 10,000 feet. They and the condor glory in the wildest and roughest parts of the mighty mountain chain.

The vicuña blends well with his background. His light brown coat often is tinted with orange and it is hard to spot against dull, earth-covered ridges, while his soft, buff under-coloring, and light facial markings are almost indistinguishable from the rocks. The guanaco also is well camouflaged, but has a little more red on him and is usually paler on his underparts.

The vicuña seems a little animal, standing slightly more than three feet at the shoulder. His Latin name, to be scientific, is *Vicugna vicugna*, and in many respects he resembles a little llama. The creature has a camel's neck and the large, inquiring ears of other members of his family, but he has not the stolidity of the short-tempered, woolly workhorse of the Andean Indians that we call the llama. The guanaco is larger, standing about four feet at the shoulder, and is perhaps seven or eight feet long. The vicuña has no naked callouses on his hind legs, while the guanaco has large ones on the knees. The head of the vicuña is short, relatively, and that of the guanaco large. The males of both species have a shrill whistle, or neigh, which is sounded as an alarm, and which carries for a considerable distance. While the vicuña runs in small bands, the guanaco, which ranges, or formerly did, throughout Patagonia and on to the islands of Tierra del Fuego, sometimes occurred in bunches of five hundred head. The usual group was fifty to one hundred.

The guanaco and vicuña belong to the camel family. They, with the two domesticated species, are the only survivors of the many species of American camels developed in Miocene and Pliocene times, most of them in what is now the United States. These camels migrated from this country, both to the north and to the south. Those that went north must have crossed by land to the Old World and become the progenitors of the present-day Old World camels and related species. Those that turned south, via the isthmus of Darien, evolved into the llamas, alpacas, guanacos and vicuñas of the Andes. Some fossil

PHOTOGRAPH FROM N. Y. ZOOLOGICAL SOCIETY

A band of guanaco, cousins of the vicuña. Note the naked callosities on the knees of the animal at the right, and the differences in coat between these creatures and the vicuña.

llamas as large as Old World camels have been found in eastern South America.

Unfortunately for the wild varieties of these little Andean camels, men have had an excuse to kill them, as they have had, or made, for almost every other creature in the world. South America, in pre-Columbian times, never could support an "animal economy," as did the sister continent to the north. The Spaniards went there solely for gold and precious minerals, and not, as did the frontiersmen of our country, for the beaver or the buffalo. The Indians of South America, unless they were an agricultural people as were those natives of the great Andean civilizations, had no sure source of food like the bison until the white man brought cattle and suffered it to go wild and over-run the grasslands. He also brought horses. Until then the Abipones and Mapuches and Puelches had hunted the wild guanaco and rhea on the Argentine pampas, but only with the luck of the hunters afoot who were after the swiftest of animals on a terrain that offered no concealment. The horse changed this situation immediately. When it arrived, the doom of the guanaco of Patagonia and the pampas was sealed, but the wild creatures could still retreat into the wilderness of forests, mountains, fiords, lakes and inlets of lower Chile and Tierra del Fuego, where the Indians, the Ona and Yahgan, lived almost exclusively on the seal, which abounded everywhere along the coast.

It was unfortunate for the seal of those gloomy, forbidding seas and coasts, that he developed a fur coat, for inevitably it brought that scourge of the sub-polar zones, the sealers. The story of the sealers has never been told in full, and this is a good thing, for the tale is an ugly one. As an example of the wildlife they found, however, it has been reported that a Capt. Fanning, of the ship *Betsy*, out of New York, took a full load of fur seal hides from the Chilean island of Musapura in 1798. He estimated that between five hundred thousand and seven hundred thousand seals remained on the island when he left, and subsequently at least a million skins were taken from there. And there were other such islands.

The result, of course, is obvious. The fur seal was exterminated and the natives, facing the same fate from starvation, turned to the guanaco. Darwin, who spent some time in Tierra del Fuego during the voyage of *The Beagle*, reported that these far southern cameloids took readily to water and were often seen swimming from island to island. They developed dust wallows like those used by bison, and he suspected that they drank salt water, but was not sure of this. Their most interesting characteristic, Darwin believed, was the urge to go to a "cemetery"—to seek a common ground on which to meet approaching death. He reported finding such places "white with their bones."

Another close observer of Argentine fauna, W. H. Hudson, also noted this peculiarity, but reported that it was restricted to the colder sections of the guanaco

range and pointed out that the animals often died in the brush-covered valleys where they were accustomed to gather for protection against the worst of the storms. He suggested, therefore, that the guanaco, when sick or wounded, was "only seeking an historically-remembered place of refuge—not death."

Having been cleared from Patagonia, the guanaco now faced extinction in Tierra del Fuego, the farthermost corner of the Western Hemisphere, and, of his vast original range, he now roamed with comparative safety only in those parts so rugged that only the vicuña could share it with him.

Only the vicuña and the vicuña hunter—for man, who hunts most creatures to extinction, had soon found an excuse to kill the vicuña. It is the animal's misfortune to sport the softest, finest wool in the world, and for this reason it was hunted from the time Pizarro landed in Peru until recent years. It was shot almost to extinction. The South American countries concerned—Peru, Bolivia, Argentina and Chile—belatedly realized the economic value of the creature they were about to write off as extinct, and each nation passed laws prohibiting the hunting of the vicuña and dealing in or transporting the pelts.

Bolivia, however, permits limited shooting by government hunters. Today in La Paz, and elsewhere in the nation, it is possible to purchase vicuña robes, and a traveler is permitted to take with him from the country a single one of these, providing it is properly stamped and cleared through Bolivian customs. Despite this exception, the animal has increased greatly in numbers throughout the southern mountains in recent years.

Prices for the robes naturally are high. At La Paz I was shown a cuello robe, which is of the finest type, made from the skin of the neck, which sold for 2500 bolivianos, a unit of currency worth at that time about two cents, American. Other robes sold for more, while those made from the skin of other parts of the body were somewhat cheaper. Of course there is some bootlegging of the valuable hides, in Bolivia as elsewhere.

In Lima I asked at a curio shop if it were possible to purchase a vicuña robe, although I knew it was illegal to deal in them in Peru. The shopkeeper, after satisfying himself that I was a *turista*, said: "Come back this afternoon. What sort of robe did you want?"

Needless to say I did not return, but I am satisfied that bootleg robes could be bought there and elsewhere in the protected areas.

Attempts have been made in several of the countries of southern South America to domesticate the vicuña, but, generally, these have been fruitless. Argentina tried to establish a federal vicuña ranch in the high mountains, but the experiment failed. Peru also has taken steps to breed the animals on government reservations, but the success of these attempts has not been fully established as yet. One such reservation is located between Juliaca and Arequipa.

Tales of the early Spanish explorers graphically described vicuña hunts as staged by the Indians under the guidance of the Incas. The native, in the old days, was not allowed to hunt either the guanaco or vicuña, which were regarded as the sole property of the royal house and the nobles.

The lion may be the king of beasts in some parts of the world, and the tiger the royal animal of some Indian states, but the vicuña was the blue-blood of the American animal world, so superior to other creatures that only royalty could claim him.

Once a year, on one-fourth of the animal range, a grand hunt, reminiscent of the vast, sporting carnivals described by Marco Polo in far-away Cathay, was held in the higher Andes. From thirty to sixty thousand Indians took part, under supervision of a member of the royal family. The hunters surrounded a portion of the field, perhaps twenty miles square, and, with long poles and spears, hounded up all the game they found. Predators were killed if possible, and the guanacos and vicuñas and other game, sometimes as many as forty thousand head, were driven gradually into corrals, which were often as much as a mile in diameter. Sometimes it would require five days or a week to make a single run. Those animals considered of no value as wool-producers were slaughtered, the hides used in local manufactures, and the meat dried as "jerky." Vicuñas and guanacos were thrown and sheared, then turned loose to go, and, in the next four years, raise another crop of wool. Common people could wear articles made of guanaco produce, but only the Inca could don a robe made of vicuña wool.

More than a century ago a law was passed in an Andean country, providing for the shearing of vicuñas to save them from promiscuous slaughter, but the law could not provide the means of capturing the fleet, light-footed camels, and hence proved impractical. With the Inca gone, there were no masses of Indians available for the grand hunts, and no domestic animal capable of running down the vicuña in fair chase.

Nowadays the hunting is done with rifles. But even at that it is not an (Continued on page 498)

The Free Eagle

By WILLIAM W. BOLE

An eagle splits a cloud
When flying high in glee,
And looking down, with screechings proud
He shouts, "You should be me,
For you are chained there far below
But I am loose to rise and go,
To live in lands of sun or snow,
For I am free—am free!"

The Cotton Boll Weevil

By ALIF CHEEM II

A cotton field in Dixie. In fields such as this one the boll weevil is to be found carrying on its destructive life cycle. The cypress trees nearby give the insect shelter in winter. In the spring it attacks the young cotton, which provides it food, and succeeding generations carry on the destruction.

SINCE the turn of the century the cotton boll weevil, unwelcome immigrant from Mexico during the season of 1892-93, has spread its depredations all over the cotton belt. It has altered the economy of many sections of the country, and has challenged the ingenuity of economic entomologists. It has caused millions and millions of dollars of loss to growers of one of America's most important crops.

The boll weevil starts its attack on the cotton plant when the female punctures the cotton bud, or square, and lays her eggs within. The larvae eat out the interior and the square falls off. As the bolls form the weevils attack them, also, and the larvae develop in the interior. There is a succession of destructive generations from early spring until frost. And, of course, uncontrolled, the weevils become more numerous as generations go on.

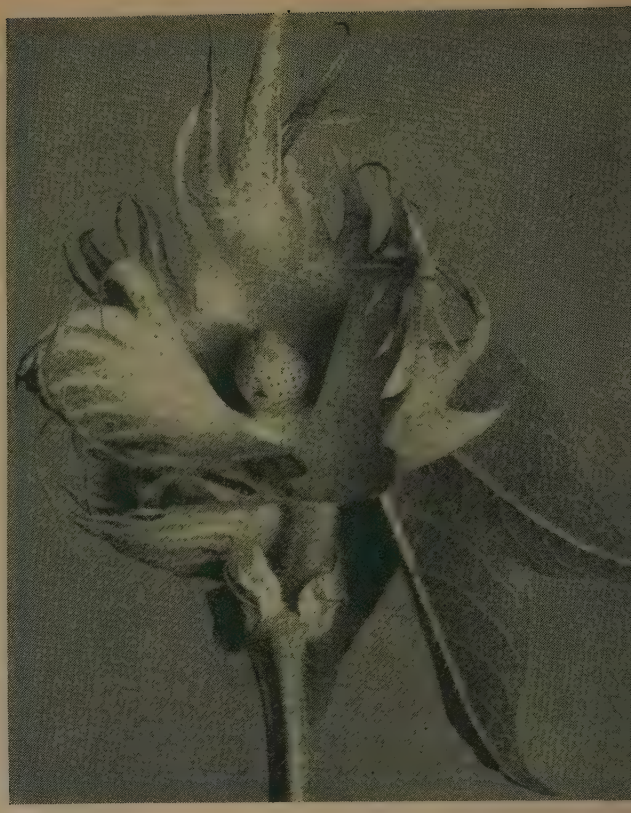
Control of the boll weevil depends upon keeping it from continuing its life cycle by infesting the later squares, which are the bolls and provide the cotton fiber. This is done by dusting, usually by low-flying airplanes. If the weevil gets into the bolls they gradually become discolored and the fiber is worthless. Usually a single larva is found in an infested boll, but as many as a dozen may occur in a matured boll.

One direction in which experimentation is going on is toward the development of a square that is weevil-proof because the "hide" is too tough for the weevil's beak to penetrate. Other methods of control involve cultural practices, such as removal of the plants from the fields in the fall and other procedures that tend to foil the weevil and interfere with its routine.

The cotton boll weevil is one of the few insects that have the habit of "playing possum" when suddenly disturbed. It will roll over and feign death in a most convincing manner, and for minutes at a time. It has been suggested that this is due to a guilty conscience, but cotton planters do not believe that the weevil has any conscience. This pest hibernates in winter, selecting for its winter sleep trees bordering cotton fields. In the bark of these trees it remains hidden, emerging in the spring to indulge in its orgies in the cotton squares.

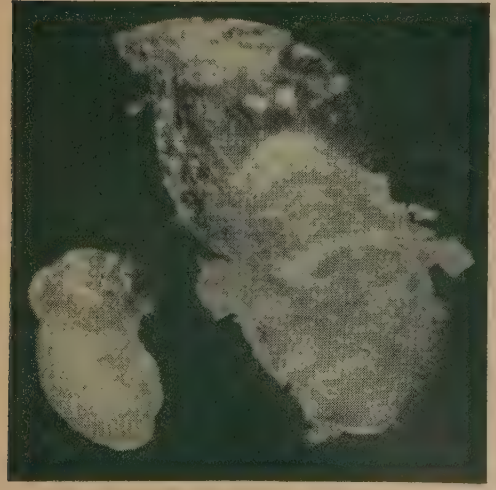
On the succeeding pages are reproduced pictures of the boll weevil, showing its life cycle. It is a colorful life that is discovered with the aid of the microscope and the camera. There are, indeed, moments of real beauty to one who is studying the insect objectively and not as the pest it is. And, of course, a knowledge of the intimate details of the life of any injurious insect is necessary to plans for its control.

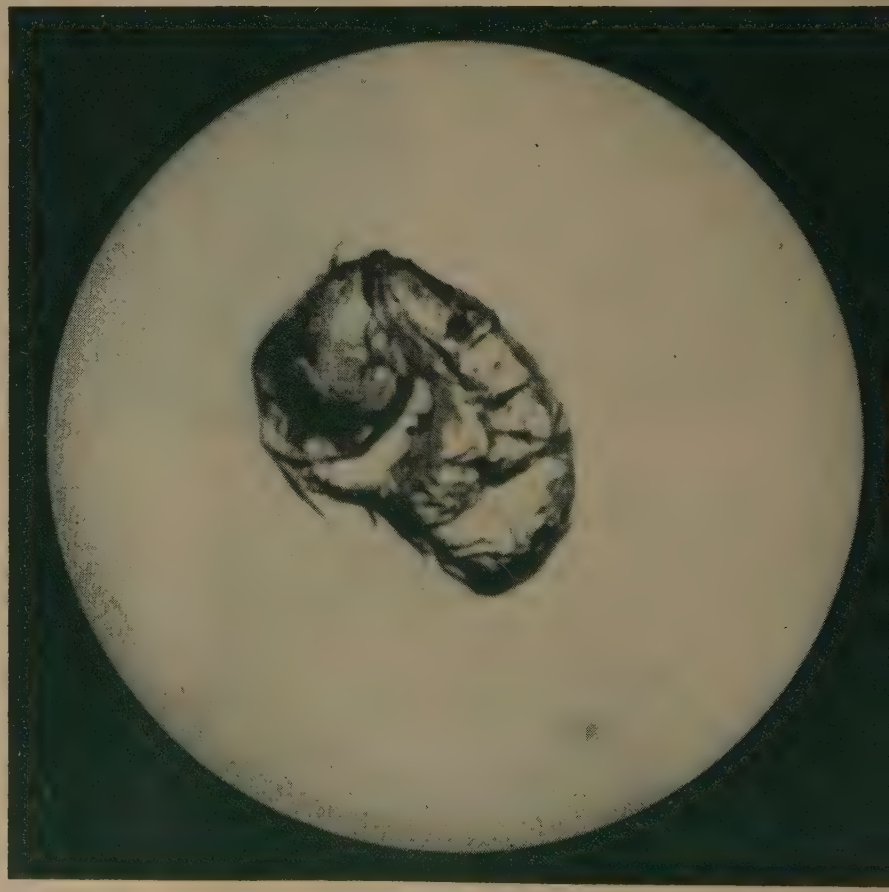
Thus we introduce *Anthonomus grandis*, as the cotton boll weevil is known to entomologists, enemy of the cotton planter and of all depending on cotton.



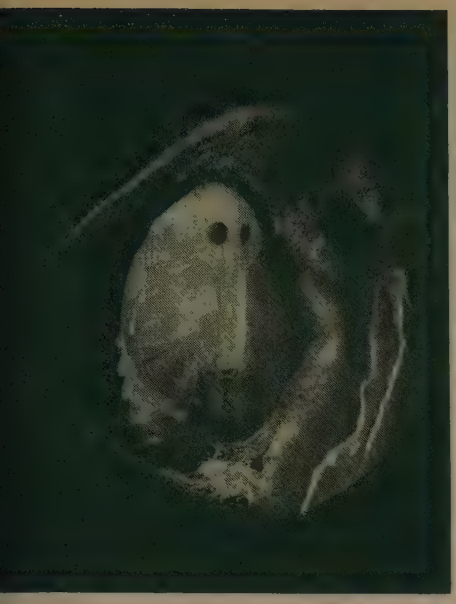
The cotton boll weevil bores a hole in a cotton square, lays its eggs among the immature anthers. This egg is pearly white and matches the anthers in color. Below is the egg, microphotographed at 500 diameters and then enlarged under polaroid illumination on a black field.

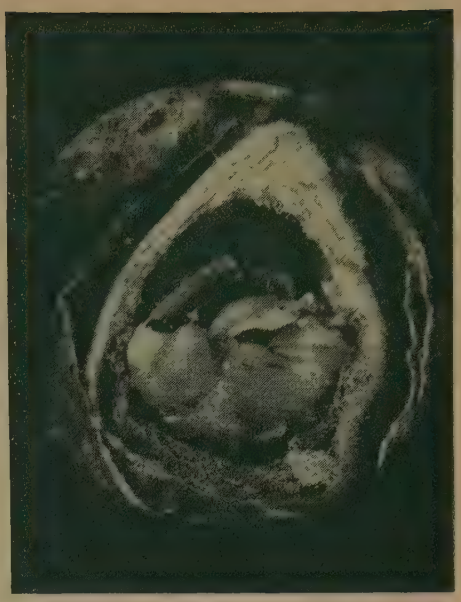
Below we see the exploded egg, from which the grub has been released. Note the break in the egg. Seconds later it had melted into the anthers.





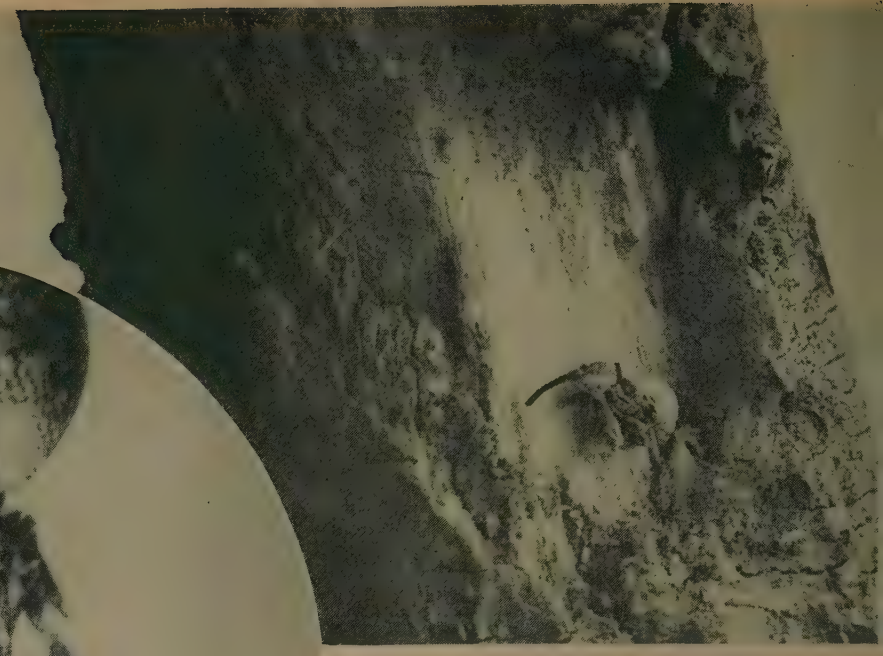
At the top of the page is the cotton square, or bud, showing the hole made by the weevil. Notice the flaring of the square. This is a sign that there is an egg within. Above is a photograph of the larva developing within the egg. This is believed to be the first photograph ever taken of this little-known stage in the life of the boll weevil. The photograph of the exploding egg at the left was taken at 1/400 of a second with a special system of illumination.



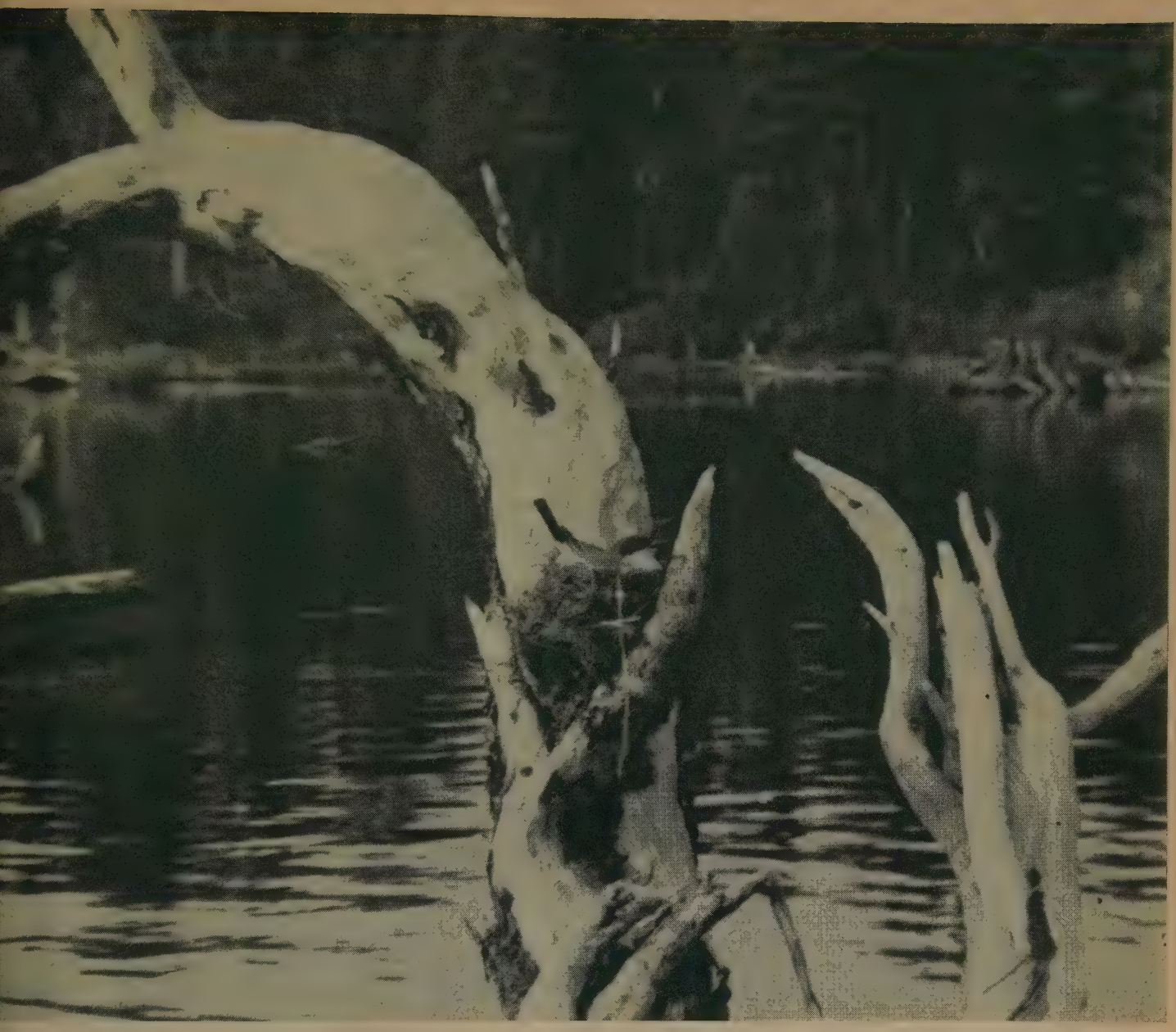


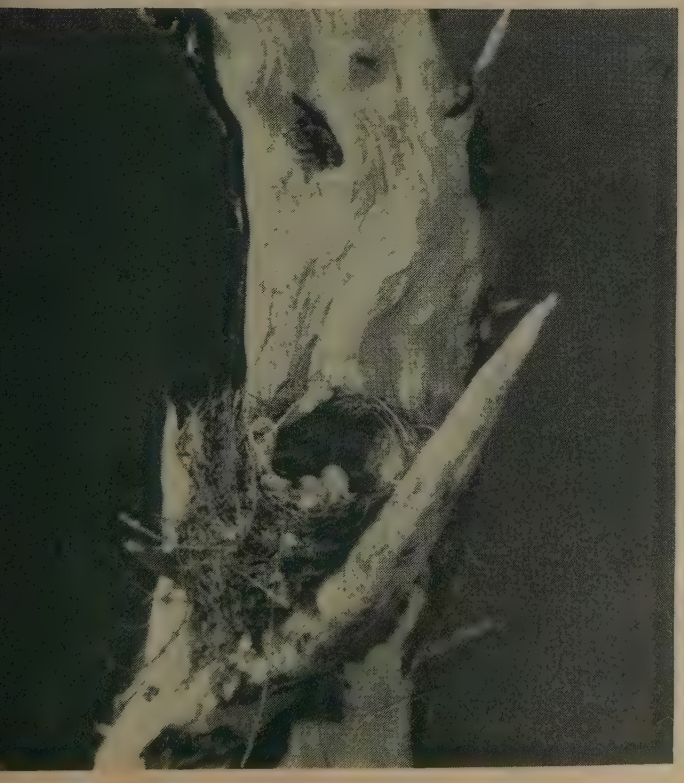
Above, left, is the pupa pulsating with life, iridescent and ice-like. Next, the pupa changes into the weevil, and then it lies down in the cotton square cavity, where it kicks vigorously. Tiny particles of dried skin are seen in the picture. At the left the perfect insect now awaits hardening, and, at the right, now hardened, it claws actively at the walls of its cell. Below, at the left, the boll weevil, a strange-looking character indeed, emerges from its square, while at the right we see the weevil at work at its business of destroying a boll of cotton.

In the winter the boll weevil hibernates in the bark of trees. The one at the right was surprised in its sleep. Below, the head of the weevil, showing its compound eyes, proboscis and the etching on its bony snout.



The boll weevil has its enemies in Nature. Among these is *Bracon mellator*, a tiny wasp that goes in search of the egg holes made by the weevil. Finding one, it lays its eggs beside that of the weevil, and the weevil grub becomes host to the parasite that hatches from the wasp's egg. Another enemy that helps keep the weevil in check is the cotton spider, *Chiracanthum inclusum*. It lays its traps near the cotton square and sucks the juices from the insects it captures.





Kingbird Nest

By RUTH HODGSON

ALTHOUGH it blended remarkably well with the dead stump, in the embrace of which it had been built, we spotted the kingbird's nest one day while fishing in Otter Lake, Wisconsin. Having our camera with us, I rowed carefully nearer the nest. My father was able to get one picture of the mother bird on the nest before she flew away, showing the red "danger mark" on her head as she left.

While we made a record on film of the nest with the eggs, the mother perched on a piece of the dead stump and told us what she thought of us. When we got too near the nest she darted about our heads, scolding as she flew. Not wishing to disturb her for long, we got the picture and left, she returning immediately, and with what seemed a flourish of indignation, to her eggs. We saw her often after that, and although we rowed quite close to her home, she only regarded us with beady eyes.

Oven-bird Friends

By GEORGE A. SMITH

The oven-bird's nest was an object of real woodland beauty. It was placed under a carpet of dead leaves and grass, with the top slightly raised. The entrance was at the side and the concealment excellent. Below, a close-up view of the nest, which was softly lined inside with long strands of fine, dry grass. The larger ends of the three glossy-white eggs were speckled with cinnamon markings.

A FRIEND of mine has a keen eye for locating unusual things in Nature, and he reported, one May evening, finding an odd-shaped nest of a bird near a woodland road. It sounded like the nest of an oven-bird, so the next evening we visited the spot. It was, indeed, an oven-bird home, and its discovery began an intimate acquaintance with the family.

The oven-bird, *Seiurus aurocapillus*, is a warbler of sparrow size, looking somewhat like a thrush. It dwells in the leafy woodlands.

The nest we had found was close enough to the road for us to use the automobile as an observation point. This was fortunate, for the bird is very timid.

On our first cautious visit to the nest the female bird was away. Her home was a thing of real woodland beauty, cleverly concealed under a carpet of dead grass and leaves, and surrounded by chocolate-brown, dry leaves and lacy ferns. The shape of the nest readily suggests a Dutch oven, whence the popular name of the bird. It was softly lined with long strands of dry grass and contained three eggs. These were glossy white, and speckled around the larger end with markings of cinnamon color.

Returning to the car to await developments, we were soon rewarded by the appearance of the bird. It walked across the road about fifty feet before us and disappeared into the undergrowth near the nest. In a few minutes the bird shyly entered the opening into the nest. We made a second cautious approach, only to have the oven-bird rush from the nest in panic, dropping its wings and tail and dragging itself away in a fluttering manner. This was in sharp contrast to the dainty and undisturbed walk with which it had approached, and was, of course, designed to lead us away.

Every few days I returned to the nest to follow the progress of the oven-bird family, and to record it on film. Invariably the parent approached the nest by about the same path. The gait was amusing, the oven-

The camera caught the oven-bird standing in front of its Dutch oven nest. The bird is about the size of a song sparrow. The general color of its body is brownish olive-green, the top of its head a dull orange, bordered on either side by black lines, which converge toward the bill. The breast is spotted like that of a thrush, and the underparts are white. The feet are pink. Both male and female have the same coloring. Below, one of the parent birds is carrying a mouthful of food to the young. Oven-birds scratch about in the woodland leaves for their food, which consists of grubs, worms, and a variety of insects.

bird pausing every few steps to nod its head and bob its tail gracefully. In fact, the generic name of the bird, *Seiurus*, means "to wave the tail."

Now and then the bird would fly up to a low-hanging limb and then walk cautiously along the branch, as though surveying the area around the nest. Sometimes it would throw caution to the winds and, from the limb, pour out its call of "Teacher! Teacher! Teacher!" This would begin softly, gradually increasing in intensity until the chant rang out through the quiet woods. Some call the oven-bird the teacher-bird. It also has a more melodious song, sometimes heard late in the afternoon when the bird is soaring above the trees. This song seems to be especially for its mate, and John Burroughs describes the song as rapid, ringing and lyrical. It certainly seems to be a true love lyric, and one not to be forgotten.

To get the pictures reproduced here I set up my miniature reflex camera on a low tripod a few feet from the nest. Because of the dense tree branches overhanging the nest, I used flash bulbs for lighting, firing them with a synchronized mechanism.

In order to get the two pictures of the adult bird, I first prefocused the camera on a spot in the path generally used in approaching the nest. I lurked fifty feet away and tried to pull the string at the exact moment the bird reached the spot.

Failure attended every attempt to photograph the young birds in their home. Whenever I approached they all shyly drew themselves back into the nest, so that they were practically out of sight. Their fear seemed to be instinctive, although not surprising for ground-nesting birds that are always in danger of some enemy of the wild.

When I made my fifth visit to the nest the three young oven-birds had left their Dutch oven home. Probably they were still in the vicinity, helping to hunt for their food under the guidance of their parents. As I strolled through their woodland that afternoon, I imagined I could hear the blithe song of the parent, still rejoicing in the care of the precious fledglings.

Two Bears Came to Town

By LEE M. LARSON

Photograph by the Author

BRUCE McDonald, home after three years in Europe in the infantry, was sitting on his front porch in Duluth, enjoying the quiet. He had had his share of excitement, but suddenly some more turned up in the form of two cub bears. They went trotting by, and McDonald and a friend, Richard Hoene, decided to try to catch them. Then things really started. Neighbors saw the chase and notified the police. Squad cars arrived, and finally one of the little bears was captured.

Immediately named "Sassafras," for reasons that remain obscure, the cub was given a large wooden box as a temporary home. He was fed on apples and honey, and generally had a fine time until, a few days later, McDonald was able to take him out to his native woods and turn him loose in the wild again.

The other cub eluded his pursuers, fled across a main street, up one porch, through a hedge and up to the crotch of a tree. There he lay, trembling with fright, wondering what foolish impulse had moved him to venture into the city where lived all these curious, two-legged animals that chased bears. A large crowd gathered to watch the chubby bear in the tree, and the bear saw all the human beings it wanted to see for a long time to come. Finally all these people decided it was time to go home, and the cub climbed hurriedly out of the tree and wasted no time getting back to the friendly woods. It is hoped that it met the other cub later to compare experiences.

Time Will Tell

MIGRATORY waterfowl are currently flying the gantlet of hunters' guns on their way to southern wintering grounds. Faced with a dwindling number of birds—amounting to a thirty-six percent loss from the peak of 1944—the Fish and Wildlife Service recommended, and the President approved, a hunting season of forty-five days each in three zones, and a reduction of the bag limit from ten to seven birds of most kinds. Only time will tell whether these regulations will prevent further dangerous reduction in migratory waterfowl numbers. We hope that the decline will be checked; but we are not confident. We believe that a thirty-day season and a five-bird bag would have been safer, and too often we have noted that a slight increase in population may be nullified by a relaxation of restrictions.

"Drought conditions in the north central states and the prairie provinces, together with overshooting last season, when more ducks were shot than were hatched and raised, are contributing factors," declared Secretary of the Interior J. A. Krug, announcing the reasons for the 1946 regulations. He warned that "we invite disaster if we dig any deeper into our breeding stocks."

Preparation of these migratory waterfowl hunting rules is no simple task. They must first be based upon as reliable survey of the number of birds and the results of the breeding season as possible. Tentative regulations are then submitted to the scrutiny and criticisms of State fish and game commissions. Even though the Federal authorities might wish to be even more drastic, they must depend upon the State agencies for cooperation and enforcement. And it should not be overlooked that these State commissions depend for their existence upon the revenue from the sale of hunting licenses, and, consequently, lean toward liberal shooting even in the face of just such disaster as the Secretary of the Interior mentions.

Thus the waterfowl regulations represent a compromise between wisdom and expediency. The Fish and Wildlife Service knows that the birds have declined about thirty-six percent; that a dry cycle seems to be starting in parts of the breeding regions; that hunting pressure has risen at least fifty percent; that illegal kill will probably rise in similar proportion. Wisdom might, then, indicate a short season, a lesser bag, even a closed season. But expediency appears to set a limit beyond which the Service does not feel it can go—assuming that it might want to—without sacrificing local support; without temporarily bankrupting State fish and game commissions. So compromise regulations are proclaimed and the authorities keep their collective fingers crossed and hope for the breaks.

We have always regarded this as unsound and unsafe. It is playing fast and loose with a natural resource—which belongs to *all* the people—to give political, administrative and enforcement expediency so much weight. Yet no one agency is to blame; it is the fault of *all* of the people whose resource this is. They should provide the funds out of the common pot to administer our wildlife resources, and to maintain the administrative agencies if these possessions, or any part of them, face disaster. The gunners do not like this plan, of course, because it vitiates their influence over the administrators. What they erroneously regard as a proprietary interest in wildlife classed as game would be surrendered by such procedure.

So we must be as content with the present system as possible, and try to see that wisdom based upon fact is accorded more weight than it usually enjoys. But no one should forget that the Migratory Bird Treaty is for the protection of birds, not gunners.

There is another point with regard to the migratory waterfowl regulations that we feel should, in all honesty, be stated. They are announced as providing a forty-five-day season. Actually, shooting starts on October 5 in the northern zone and runs to November 18; from October 26 to December 9 in the intermediate zone; from November 23 to January 6 in the southern zone. From October 5 to January 6, inclusive, is, if we can count, seventy days. Many birds, migrating from the extreme north of the northern zone into the southern zone, face shooting for that period, even though the hunters may not migrate, and some of them do so.

Decrease in Canada geese has resulted in a closed season for these birds in Minnesota, Wisconsin, Michigan, Iowa, Illinois, Indiana, Ohio, Missouri, Kentucky, Tennessee, Arkansas, Louisiana, Mississippi and Alabama. There is a closed season on snow geese in Wyoming, so that gunners will have no excuse to say that they shot a rare trumpeter swan thinking it was a snow goose. Wood ducks are completely protected in Arizona, Colorado, Kansas, Massachusetts, Nebraska, Nevada, North Dakota, Utah and Wyoming. The 1946 regulations also permit shooting one-half hour before sunrise—why we will never understand. Many birds are crippled and lost in this half hour.

So the duck hunters are taking to the blinds for 1946. We hope that the kill will show a sharp decline, and that the regulations will prove to have been adequate. If they do not, we hope that wisdom and courage will dictate far more drastic restrictions to prevent the tragedy of the mid-thirties, when we were saved from seeing the virtual extinction of at least several waterfowl species by the intervention of Nature, and Nature alone.

Tasmania's Vanishing Marsupials

By ANTHONY DE VOS

Illustrations by the Author

Two species of rat-kangaroos are still common on the island of Tasmania, living in colonies on the forest outskirts.

LITTLE is generally known about the mountainous island of Tasmania, one of the six States of the Commonwealth of Australia. Maps show it in the Antarctic Ocean south of the State of Victoria. Encyclopedias reveal that this island contains 26,215 square miles, is nearly as large as Scotland, and is one of the most prosperous Australian States. It has large sheep stations, or ranches, and wheat farms, and it produces Australia's finest apples and potatoes. Its dense rain forests furnish good timber for building purposes and the raw material for the largest paper industry of the Commonwealth. Large zinc and copper mines have also been established there.

Few people know that this beautiful island sustains a still flourishing fauna of those strange-looking "pouched" animals or marsupials peculiar to Australia. These mammals rear their progeny in a ventral pouch.

Although Tasmania has been separated only recently, geographically speaking, from the mainland, this separation has been long enough for the development of several animal species that occur only on this island. Such species are called "endemic" species. For example, Tasmania is inhabited by five marsupial, three rat and fourteen bird species found nowhere else. Only two species of lizards and one of frogs are found on the island, probably because it was separated from the mainland before other species had the opportunity to invade it. The Tasmanian mountain shrimp, found in highland pools, is one of the most primitive forms in the world. It could be called a "living fossil," as all of its relatives have been extinct for a long time and can be found only as fossils in other parts of the world.

Twenty-one species of pouched animals occur on the Island of Tasmania. Most interesting among the carnivorous marsupial species are the Tasmanian "pouched" wolf and devil. The Tasmanian wolf has a head similar in shape to that of a wolf, while its body resembles that of a dog. The tail, however, cannot be wagged like a dog's tail. When hard pressed, it will rise on its hind legs and run like a kangaroo. It hunts at night. Once this animal, which has stripes on the back and a tail like a tiger, was common all over the island. It caused such havoc among the sheep that a bounty was placed on its head.

This largest of the marsupial carnivores was almost extinct before it was placed on the list of protected animals. Now this timid and cowardly animal is found only in the remote western part of the island, which is very rugged, mountainous, and partly covered with dense rain forest and thick undergrowth. Many domestic dogs and cats that have reverted to the wild are also located in this region, and they prey upon the same diminishing wildlife that the wolf uses for its subsistence. Lack of food, diseases transferred to the wolf by stray domestic animals, and trappers are all factors that caused this animal to become increasingly scarce. If more protection was offered by game wardens in keeping trappers out of protected areas, and also in destroying stray domestic animals, the future of the Tasmanian wolf might be more secure.

The Tasmanian devil is so called because its large

The Tasmanian devil is so called because it has a large and rather ferocious head. Persecution has driven it from many of its former haunts and it faces extinction unless it is given protection. Recently placed on the protected list, it now has some chance to survive.

Bennett's wallaby is a race of the brush wallaby of the mainland. It may still be found in scattered bands in unsettled parts of Tasmania, even near the snowy tops of mountains.

head looks quite ferocious and gruesome. Its general color is black, and its body somewhat bear-like. The devil does not need the extent of country that the wolf does, and is satisfied with living in rocky and inaccessible portions of the mountains. It preys upon smaller animals, such as wallabies, and also on carrion left by wolves. Although the devil is more common than the wolf, it has been driven from many of its former haunts, and will, if not carefully protected in sanctuaries, vanish in a not too distant future. It has been placed only recently on the list of protected species. Fortunately it is found in several sanctuaries. The mainland form of the species has been extinct for some time.

Two other carnivorous pouched animals are the spotted tiger and native "cats." Although they are persecuted because of their raids on poultry houses, they are still fairly numerous.

The Tasmanian kangaroo, or forester, is the only large kangaroo found on the island, and is distinguished from the great gray kangaroo of the mainland by its somewhat heavier build. This kangaroo species once inhabited almost the whole of Tasmania, but it became reduced to near extinction and is now restricted to the northeastern and central part of the island. Most of the small bands are to be seen on private properties, some in one or two game sanctuaries.

Bennett's wallaby is a race of the brush wallaby of the mainland. It is still found in scattered bands in the unsettled parts of the island, and may be at all altitudes, even near the snowy tops of the mountains. As the Tasmanian kangaroo is almost extinct, this large wallaby is usually referred to as a kangaroo. Because the species is hunted intensively for its fur, its future will have to be watched closely or it also will become extinct.

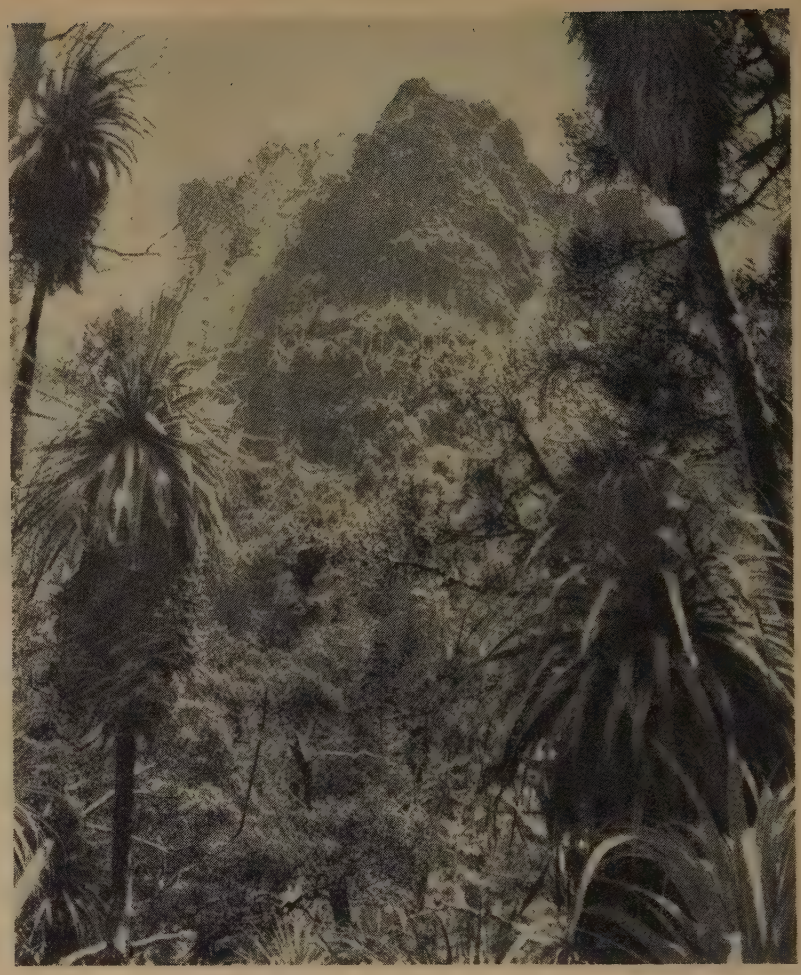
The Tasmanian, or red-bellied, pademelon is a small species of wallaby that can be found in the low scrubs of Tasmania, on the islands of Bass Strait, and in southern Victoria. This species has also been called "rufous wallaby" because of the red color of the fur. It has decreased, due to hunting and trapping, from a very common to a rare inhabitant of the scrubs.

The Tasmanian ringtail opossum is probably the most common marsupial of the island, although the species has been much reduced in numbers. Many color varieties exist, ranging from nearly white to black. The ringtail makes its nests in hollow trees and branches, like a squirrel. Another opossum species, the Tasmanian brush-tail opossum, is the most valuable fur bearer of Tasmania because its blackish-brown fur is thicker and longer than that of the mainland form. It is therefore extensively trapped, even in the closed season.

Three other opossum species are found on the island—the sugar glider, popularly called "flying squirrel" because of its ability to glide from one tree to another and its resemblance to a squirrel; the pigmy; and the little Tasmanian pigmy opossum.

The island wombat of Tasmania and Flinders Island lives in all kinds of desolate places, and is even found high in the mountains. This clumsy and stoutly-built animal looks like a quaint tailless rat, and has no commercial value at all, thanks to the

The Tasmanian wolf, with its striped back, has a head like a wolf and a body like a dog, but a tail that does not wag. When hard pressed, it will run on its hind legs like a kangaroo.



Many of the persecuted forms of unique wild animals in Tasmania have found refuge in the remote mountain regions, such as this wild region of fantastic peaks above Lake Tahune.

rough nature of its fur. As wombats make intensive burrows, and, therefore, do some damage to fencing, they are still unprotected and are being destroyed as pests. Fortunately the animal is able to live in the most rugged and poorest parts of the island, and is still rather common in those places. The species has been exterminated, however, on all of the Bass Strait islands except for Flinders Island, where it is rare. As all the wombat species on the mainland are rare, Tasmania is about the only place where these speedy diggers have a good stronghold for the future.

There are two rat-kangaroo species to be found on the island of Tasmania, the Tasmanian rat-kangaroo and the long-nosed rat-kangaroo. The latter is a sub-species of the mainland form. Rat-kangaroos are small, kangaroo-like animals of the size of a small rabbit. During most of the day they lie curled in a grassy nest under a fallen tree or a small bush, but if startled they will travel with remarkable speed for a short distance and then dash off for cover. Their slender tails are used in a practical way for carrying nesting material. They live in colonies near grassy plains on the outskirts of forests. Rat-kangaroos have nearly disappeared from the mainland, mainly through depredation by foxes. As foxes have not been introduced on Tasmania, smaller marsupials have a better chance of survival on this island than on the continent of Australia. Both species of rat-kangaroos are still locally common.

Other small pouched animals that find a last refuge on Tasmania, and have practically vanished on the mainland, are the Tasmanian barred bandicoots and the southern short-nosed bandicoots, small animals shaped like rats, and which dig conical pits in search of grubs. The little Tasmanian marsupial mouse is the smallest pouched animal found on the island.

Although Tasmania has many game sanctuaries, and does not have the fox problems of the mainland, the number of its pouched animals is steadily decreasing. Only the Tasmanian Government is to blame for this. According to students of conditions, the three main reasons for the decrease in numbers of the marsupial fauna are too many open seasons, insufficient supervision of trappers by game wardens, and depredation by domestic dogs and cats.

Since 1934 there has not been any closed season for kangaroos and wallabies. Ring-tail and brush-tail opossums are allowed resting periods of only two years, which is much too short for these slow-breeding marsupials to recover.

Tasmanian devils, tiger cats, wombats, and kangaroo-rats were still on the list of unprotected animals in 1939, and wombats are still unprotected. During the open season of 1933, the Arthur and Piernan Rivers sanctuary was thrown open for the hunting of kangaroos and wallabies, a travesty on the name "sanctuary."

Bird protection is also poor on the island. There is, for instance, still an open season on the nearly extinct Cape Barren goose, a goose that is only to be found on the south coast of the Australian continent, the Bass Strait islands and Tasmania.

The five cormorant species that can be seen on the island are still unprotected, although it has been proved long ago that these birds do little economic harm to fishery. The Island Fisheries Board even offers a reward for killing specimens! Harmless birds like the native hen, magpies, and coot are unprotected at present.

Zoologists, and other animal lovers interested in the unique Tasmanian fauna, all hope that the Tasmanians will soon realize that they will have to watch their interesting animal life more closely in order to keep some of its most striking members from the fate of so many marsupials of the mainland of the Commonwealth of Australia—extinction!

U. S. BUREAU OF PLANT INDUSTRY PHOTOGRAPHS

Maize, or corn, was probably the greatest food plant gift of the New World to the Old World. In an ancient Chilean grave the corn above was found, and the field of corn at the right traces its ancestry to the maize of the early Amerinds.

Vegetable Voyagers

By ALBERT W. C. T. HERRE

IMAGINE a world without a baked potato or candied sweet potato; without stringless beans or baked beans; without roasting ears, popcorn or roasted peanuts! A world without the succulent tomato, the savory pumpkin pie, or the aromatic pineapple, is difficult to picture. Yet such was the world of the Knights of the Round Table, of Robin Hood, and the Maid of Orleans.

Accustomed as we are to a great variety of fruits and vegetables, we do not realize how limited were the diets and range of vegetable foods of our European ancestors before the discovery of the Americas. In all Europe only the Saracens in Spain had much diversity of fruits, or enjoyed vegetables of high quality. They had introduced these products from the Near East and other parts of the Moslem world, and they were the most skillful agriculturists of Europe. But even their vegetable markets would have been considered meager by our shoppers of today. Only a few places in southeastern China, in Java, and, perhaps, limited areas in India and Africa, had a variety of fruits and vegetables of good quality and comparable in any way with those of the Americas, from Virginia and Illinois to Brazil and Peru. In general, the native Americans ate far better and in greater variety than did the Europeans, Africans, and Asiatics.

The first European voyages to the New World were to regions where agriculture and horticulture were highly developed. The choicest and most useful kinds of fruit and vegetables were promptly taken—especially from the West Indies and Brazil—to Spain and Portugal. Wherever possible they were speedily utilized in the warmer regions of Europe, and were carried by slave traders to Africa, where they penetrated from the coasts to the remote interior. The Aztec soldiers of the Spanish army took native foods from Mexico to the Philippines, and from there their culture spread to China, Japan, and throughout the East Indies and Malaya. At the same time the Portuguese carried food plants to Ceylon, India, Malakka, Amboyna, and the rest of the Molukkas.

It is true that many people, in all parts of the world, resist attempts to change their diet or food habits. At the same time people of all lands, whose diet is often insufficient in quantity and quality, joyously hail the introduction of a new, savory and nutritious food plant. I have myself observed this in remote regions of Mindanao and New Guinea. The new food plant is regarded as a great benefaction, and passes with astonishing rapidity from tribe to tribe. until it crosses a continent, or penetrates vast distances into the interior, unless stopped by the barriers of climate, deserts, or great mountain ranges.

As one result of these miscellaneous distributions, people soon began to claim introduced plants as of native origin. These false claims were bolstered by travelers and officials alike, all ignorant of botany and of the early Spanish and Portuguese accounts. which told in detail about many plant introductions. Difficulties were further increased by the criminal stupidity and bigotry of many of the clergy, who deliberately destroyed the native books and culture. The Aztecs, for example, had a highly-developed body of botanical lore, with botanical gardens and an ex-

tensive *materia medica.* Bits of this survive, saved by the wisdom and zeal of a few far-sighted priests.

The most important of the food plants to come from the New World tropics was maize, or corn. This invaluable plant does not occur wild, but was probably a native of Central America. From there skilled Amerind farmers had extended its range, bit by bit, until, at the time of the white invasion, it was the principal food plant from Quebec and Montana to Argentina and Chile, except in the rainy lowland tropics. All the kinds of corn now known—dent, flint, sweet, pop, soft, and pod—were developed long ago by the Amerinds, who had innumerable varieties, each adapted to a particular locality. They thoroughly understood seed selection and the use of fertilizers.

Corn was taken to Europe by the first Spanish voyagers, and it spread rapidly from Spain to the rest of the Mediterranean area. The Portuguese took it from Brazil to Portugal, Madeira, India, Java, the Molukkas, and to both the east and west coasts of Africa. At the same time the flint corn of Mexico went with the Aztecs to the Philippines, and from there soon reached China. It also reached China from India, so that soon it was claimed as a native of China because it was grown in the remote interior while still unknown over much of the coastal region. In Africa corn soon spread widely south of the Sahara, and became the chief dependence of the natives of South Africa.

The peanut, native of tropical America, was cultivated in Brazil, Peru and the Antilles long before the time of Columbus. Taken to Africa by the slavers, it soon spread widely and was claimed as a native plant.

Elsewhere corn also became a principal food of the people in the drier and more barren rocky islands of the oriental tropics, such as Timor, Cebu, and Bohol. In Europe it is the principal diet of the Italian peasantry of the Po Valley, and of several Balkan countries. While the greatest use of corn is in feeding livestock, it is likewise important in the production of starch, oil, glucose, and a variety of miscellaneous products that utilize practically the whole plant.

Several species of *Solanum* that produce tubers are native to the mountains, from southwestern Colorado to Chile, and two or three species were cultivated in prehistoric time from Chile to Colombia. Only one of them, our "Irish" potato, *Solanum tuberosum,* came into general use, and is now cultivated almost all over the world. While the potato is of great importance in the United States, it is in northern and central Europe that it is often the chief starchy food of the common people. In addition to its use as food for man and beast, the manufacture of industrial alcohol and of starch is of much importance. Normally, the greatest total and per acre yield is in Germany, Poland and Russia ranking next in production and utilization of potatoes.

Cassava, the root of several species of *Manihot,* has been cultivated since prehistoric times in the humid tropical lowlands of Brazil, the Guianas, and similar regions in South America. Even today it is the chief bread food of the inhabitants of those same regions. *Manihot utillissima* has a poisonous juice, which must be removed before the root is safe for human food. The large fleshy roots are rich in starch and may be cooked and eaten in various ways. One of the commonest is the preparation of tapioca. Cassava spread rapidly, especially to regions where neither rice nor corn grow well. Slave traders carried it from Brazil to the west coast of Africa, where it became the main food of Angola. It went with Aztec soldiers to the Philippines, and spread rapidly over the island world. It is now grown in all warm countries. In Queensland, Australia, Java, and the Philippines, great plantations are devoted to the culture of cassava for making starch, which is used in various industries.

Many people confuse a quite different thing—arrow-root—with tapioca. Arrow-root belongs to a different family, and is cultivated for its fleshy rootstocks, rich in starch. It is probably a native of Brazil, and was cultivated in prehistoric time in both Brazil and the West Indies. At an early date it was carried to almost all warm countries, becoming generally naturalized and spontaneous. Arrowroot is grown commercially in South Africa, Queensland, Bermuda, the East Indies, India, and Fiji. The starch is used in making crackers, wafers, and cakes, and in prepared foods for infants and invalids.

The sweet potato, *Ipomoea batatas,* a member of the morning glory family, is the original potato, but by a curious twist its name was applied to the very different plant that we know as the common potato. The sweet potato is a native of the American tropics,

unknown in a wild state. This indicates its cultivation since remote times. In pre-Columbian times it was an important crop in the West Indies, Yucatan, Honduras, tropical Mexico, Peru, and perhaps other parts of tropical America.

The kamotl, or sweet potato, went with the Aztecs to the Philippines, where it became the kamote of the Filipinos, and spread rapidly all over the islands. Soon it was cultivated by many tribes that had never seen a white man or an Aztec. Chinese traders took it home, and later to the Ryukyu Islands, where it became the basic food of the people. It spread from the Philippines all over the East Indies, and in a short while was the principal food of many tropical islands. The sweet potato reached Africa through numerous introductions on both coasts, and was early cultivated in parts of India.

The sweet potato is a better food than the potato, as it provides not only starch but has more protein and also contains sugar. The sweet potato is not a yam, which is a strictly tropical plant belonging to an entirely different family.

The only bean known to our European ancestors was *Vicia faba*, the faba of the Romans, with seeds of rank and indifferent flavor. This is the bean that Capt. Jinks fed to his horses in the old song, and is

The sweet potato, a member of the morning glory family (one variant of which is here shown), is the original potato, although a very different plant became known as the common potato. Lima beans are native to Brazil, but Europeans met them first in Peru, which had many varieties.

the broad or Windsor bean of England. It is grown for green manure in California, and by a few Italians and Portuguese in their family gardens, but is unknown to most people in this country.

None of the savory and nourishing beans cultivated in the United States, and now known all over the world, were a part of European diet before the time of Columbus. Four species of beans native to the American tropics were cultivated for their seeds or seed pods in pre-Columbian times. All our common bush and pole beans are variants of *Phaseolus vulgaris*, and were grown practically all over North and South America in prehistoric time. The cultivation of corn and beans went together. By selection the range of beans has been greatly extended, and, for instance, England no longer depends on France for the *haricot*, or French bean grown successfully in England for a long time.

Lima beans, *Phaseolus lunatus*, are native to Brazil, but Europeans met them first in Peru. In pre-Columbian times they were cultivated from Peru to the southern United States. The Amerinds not only had our common, climbing, large, white-seeded lima beans

but also had speckled, pure red, and black-seeded kinds, dwarf lima beans, small-seeded kinds, and others that we do not have. The lima bean was soon carried to Africa by slavers, to the Philippines by Aztecs, to the East Indies by Portuguese, and is now found in most warm temperate and tropical regions.

The scarlet runner, *Phaseolus multiflorus*, is not only a good food plant but is also cultivated as an ornamental for its large, brilliant, scarlet flowers. It is a native of tropical Mexico, but is now distributed all over the world wherever climate permits. Once established, it is a perennial where the ground does not freeze, the root living over, so that many grow it only as an ornamental vine for covering trellises. The beans are of excellent quality.

The asparagus, or yard-long bean, *Dolichos sesquipedalis*, is a native of tropical South America, probably Brazil. It was cultivated in South America and the West Indies before the time of Columbus and is remarkable for the size of its pods. They are commonly eighteen inches to two feet in length and may reach three feet or more; the pods are not mere strings, but are broad and thick. Their flavor does not match their size, as they are of ordinary quality as food. They are grown in the warmer parts of the United States, or in regions with a long, hot, growing

We may call it the "Irish" potato, but it traces its ancestry to the New World. Several species of *Solanum* that produce tubers are native to the mountains from southwestern Colorado to Chile, but only one came into general use, and is now cultivated almost all over the world as one of its most important foods.

season as in the corn belt, usually as a curiosity and as a screen cover rather than as food. They are known as Cuban beans by many, as they are grown there for food. The asparagus bean is cultivated as a food plant in the south of France, Italy, and many other warm, temperate or tropical places. It is called asparagus bean because the young pods, a foot or more in length, may be cooked and eaten in the same way as asparagus.

Another peculiar bean of much more restricted range is the yam bean, *Pachyrhizus erosus*, better known as Sínkamas or Jícamas. This climbing plant is a native of Mexico, and was cultivated by the people of Mexico, Central America, and the West Indies in prehistoric times. The young bean pods may be cooked and eaten as common string beans are, but the ripe seeds are poisonous. The plant is really cultivated for its large, edible, turnip-like root, which is usually eaten raw but may be cooked as a vegetable, used in soup, or pickled. It was taken very early to Guam, the Philippines, the East Indies, and China, and has become naturalized in the oriental tropics. Hence it occurs there wild as well as cultivated.

The peanut, *Arachis hypogaea*, is another very valuable legume native to tropical America. Long before the time of Columbus it was cultivated in Brazil, Peru, and the Antilles. It was one of the plants taken to Africa by the slavers, and there cultivated to feed their unfortunate victims. Soon it spread across the continent and was claimed as a native plant in Africa. Of course it was carried to the Philippines, and from there to China and the East Indies, and, before long, numerous places in the Orient claimed the peanut as a native son.

The development of agriculture in the southern states made the peanut crop important, but it is relatively more important in some other regions. In southern China peanut oil is the cooking fat for many millions of people, and among the Mohammedans of the East Indies, Philippines, Malaya, and India peanut oil is widely used. The Hindus of India and Ceylon likewise use it extensively for cooking. Senegal grows peanuts on a large scale, exporting them to France where they help to make "olive" oil. In other parts of Africa they are of importance in the native domestic economy.

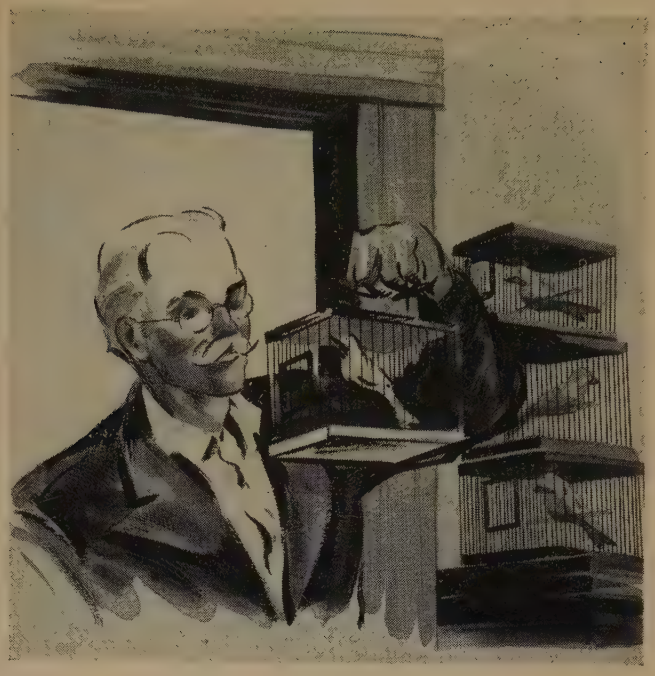
The vegetables known as squash belong to several species and were all cultivated by the Amerinds from prehistoric times. They were probably all native to the South American tropics, but various kinds had been carried to, and cultivated over, much of both North and South America long before the white man came. The largest and best of the squashes, the best for baking and for "pumpkin" pies, are varieties of *Cucurbita maxima*. Many kinds were cultivated in Brazil, Chile, Peru, Central America, and the West Indies in prehistoric times. The Valparaiso squash, which sometimes weighs more than a hundred pounds, was introduced into the United States from Chile in 1812. The late squashes, such as the Hubbard, which keep through the winter under favorable conditions, were introduced from the West Indies. The squashes of the *maxima* group are grown throughout the tropical and warm temperate regions of the world.

In remote times the cushaw, *Cucurbita moschata*, from tropical America, was cultivated extensively throughout the upper Mississippi Valley and lower Canada to Florida, and also in Central America, Brazil, and Peru. It is now grown largely in the Mediterranean countries, and all through southern Asia to China south of the Yang-tse, and also in Portuguese West Africa. The cushaw was highly esteemed by the Amerinds and pioneer whites of the Mississippi Valley, but is appar- (Continued on page 500)

Bird Lover, Belgian Style

By JACK DERMID

Illustrated by Frederic Sweney



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This article will, we suspect, surprise and shock most of the bird enthusiasts among our readers. This G.I. report is published, however, as a startling example of the attitude toward wild animal life that largely exists in continental Europe.

SHORTLY after my army unit moved into northern Belgium, I made the acquaintance of a Belgian who was both interested in birds and could speak English. François had been trapping and breeding birds for more than thirty years. Retired on a pension, he spent practically all his time working with them. Birds were even responsible for a large part of his social life, for he was the secretary of a local bird society of some two hundred members.

When I visited his home, I found François holding a twenty-two rifle and peeping out the partly-open door of his back porch. Seeing me, he laid aside the gun and told me he was attempting to kill a house sparrow that insisted upon building a nest in the gutter of his home, adding that the bird was a terrible pest. When I said that I believed English sparrows were more common in the United States than in Europe, he was astonished. François had many grievances against the sparrows, chief of which was the damage he claimed they did to his garden.

Neatly arranged against the wall of the enclosed rear porch was a number of bird cages. Several of them contained various kinds of canaries that filled the place with music. Each of two other cages held a male European goldfinch, François told me that he intended to breed these birds with female canaries to produce beautiful hybrids for his own collection, and to sell at fancy prices on the market. This goldfinch is quite different from the American species. It has a red, white, and black head, a brownish body, and a wide, yellow bar on each wing. In the last cage was a dainty little brown bird, unfamiliar to me. Its yellow breast was heavily speckled with brown. François merely called it *cini* for short. Its whole Flemish name is *Middeneuropeesche kanarie.* He also planned to breed the *cini* with a canary.

François took me into the garden to show me how the *cini* was captured. A pair of small cages, fastened together, were placed on the ground. In one cage a live *cini* sang constantly. On the top of the other cage was an open trap door; inside seeds and water. A free *cini,* attracted by the notes of the decoy bird, would investigate, see the bird inside with food, enter the opening and land on a lever that caused the trap door to close. The same trap was sometimes used for catching other species.

It was spring at the time of my visit, and François had most of his garden planted. A large portion of it was used to grow different kinds of seeds for his birds. This was necessary during the war because of the scarcity of feed on the market. Across a small plot strings of many colors and sizes were stretched in a haphazard manner and several inches above the ground. My friend told me that the strings were to keep house sparrows from scratching up recently planted seeds, the network fooling the birds, who considered it a trap.

Near the house was a large cage about three yards wide, six yards long, and high enough for a man to stand inside. A shed adjoined it. A cedar and several other bushes were growing along one edge, and near the center were large, dead branches. François said that in the days before the war this aviary contained more than two hundred individual birds of many species—canaries, blackbirds, goldfinches, chaffinches, thrushes, larks, and others. Whenever possible, he kept both sexes of each species, and during the breeding season abundant nesting material was scattered inside the cage. Many birds would not mate in captivity, but usually most of the available sites held a nest, most of the time the birds living together in harmony. François was forced to sell or release this collection because of the food situation during the war.

A weather-beaten box trap, similar to those used

The captive skylark serves to decoy others of its kind to the Belgian traps, a special arrangement making the bird active and a more effective decoy.

in the South to catch rabbits, sat beside the aviary. François laughed when I pointed toward it, and a twinkle remained in his eye as he told me its history. Soon after he began keeping birds in the yard, cats appeared regularly and frightened the birds by attempting to get inside the cage. This trap, baited with fish, soon produced a decline in the cat population of the neighborhood.

Later in the afternoon, we took a walk in the country, and François explained in detail how he traps skylarks and other migrating birds in the fall. It was the same lark that Shakespeare and others have immortalized in literature. Although not a handsome bird and small, it is a wonderful songster. According to François, there would be plenty to eat if many birds are trapped in one day, and he extolled the merits of roasted lark.

It puzzled me that the law allowed this wholesale trapping of song birds. François assured me that it was all right to trap the skylark because its diet consisted chiefly of vegetable matter. Most insect-eating birds are protected, but anyone can trap the seed-eating species during the month of October after purchasing a permit from the government. Evidently there is no limit on the number of birds trapped, for, on some days, François said he had caught more than three hundred larks.

Before the opening day of the legal season this Belgian "bird lover" scouts the surrounding countryside for a suitable field in which to place his nets. Many factors are taken into consideration before a choice is made. The field must be large and without barriers along the edges that would cause the migrating birds to fly high. Once a location is decided upon, the foundation of the trap is located and a blind is constructed. François does not exercise great care in building the blind because the birds are rather tame. Unless the yield of birds is poor, he uses the same field during the whole month, sometimes for several seasons.

Conditions permitting, François said that he is out in the field every day during October, and it takes bad weather to keep him away. However, best results are obtained on mild, sunny days. After telling me this, the Belgian described a typical day at the nets. He arrives at the location as soon as possible after dawn, arranges the nets and springs on the ground and fastens them to the foundation of stakes. The task requires about twenty minutes. After testing the apparatus, and putting out a live skylark for a decoy, he retires to his improvised blind.

The whole trap was a simple affair, consisting of two nets stretched on separate frames. Each measured about eighty feet long and seven feet wide. To obtain the maximum amount of coverage in the shortest possible time, the nets are placed side by side on the ground and twice their width apart. Great springs furnish the power necessary to throw the nets over simultaneously. A rope leading from the blind is attached to the release of the springs. If a flock of birds fly low over or in between the nets, François pulls the rope. Like two giant mouse traps, the springs instantaneously flip the nets over toward each other, pinning the birds against the ground.

In order to lure the skylarks and other birds into the desired position, François places a live lark between the nets. He employs an unusual but effective way to make the decoy flutter and call in a lifelike

manner. The lark is fitted into a tiny leather harness, which is attached with a short string to a thin rod. This, in turn, is fastened to a fulcrum. By a pulley and string arrangement, the bird can be raised and lowered. This makes it active. Besides that, François uses a set of small whistles to help lure the birds.

The skylark is the principal bird sought, but many other birds are often taken with them. Better song birds, like goldfinches and bullfinches, are kept alive for his aviary, or to sell. François always destroys and discards house sparrows, and releases most protected species. Occasionally he catches several partridges. Among the other birds he keeps for food are chaffinches and bramblings. They are sparrow size, but he claims they have a superb taste if fried in butter. They are eaten bones and all. After keeping a few skylarks for his own use, François sells the balance on the market for food. Hawks often swoop down in an effort to catch the decoy bird, and a bounty is paid for certain kinds by a pigeon society.

Before he retired from work, François always took leave in October to trap birds. And every year he has kept a record of the results of each day. The number of each species captured, the weather conditions, and any interesting happenings are all included in his notes. Later, when glancing over them, I suggested that it was dangerous for the wildlife of his country to kill so many birds. He answered me by saying there seemed to be as many birds as ever, adding that there are just too many birds for them to become scarce.

I told my host that I had not seen a nightingale, the marvelous singer of the Old World, and asked him where I would be likely to find one. He said it was too early in the year for them now, but he could show me one later. He added that the nightingale is one of the easiest birds to capture. Once one is located, the trapper scrapes away the leaves and scratches up the earth near the bird. A trap, which consists of a net and a spring to throw it, is placed on the spot and baited with a live worm. Usually the bird will fly to the scene and will be caught immediately after the trapper walks away. Since the nightingale is accustomed to seclusion it will not sing in captivity unless a curtain is placed around its cage.

When we returned to his home, François led me to the attic. There he kept a number of cages for breeding canaries. The cages were designed with a bay window that holds a plaster bowl, which the birds line with grass to form a nest. In the two cages that contained a pair of canaries, the nests had already been completed, and a single egg was in one of them.

Besides breeding canaries together, François breeds male wild birds with female canaries. Similar types of birds are used, such as the *cini*, goldfinch, and siskin. In crossing the bullfinch the female is used. Of course the sexes of the birds can be reversed, but it has been proved that the most beautiful hybrids are produced this way. The resulting crossbreeds are usually desired by bird collectors and bring fancy prices.

After feeding the canaries in the attic, we went downstairs to feed the birds on the back porch. Before departing, I was invited to come again in October for a day of trapping birds. This was impossible, but François wrote me that he had caught twenty-two goldfinches and more than 2000 larks in 1945.

Indian Names

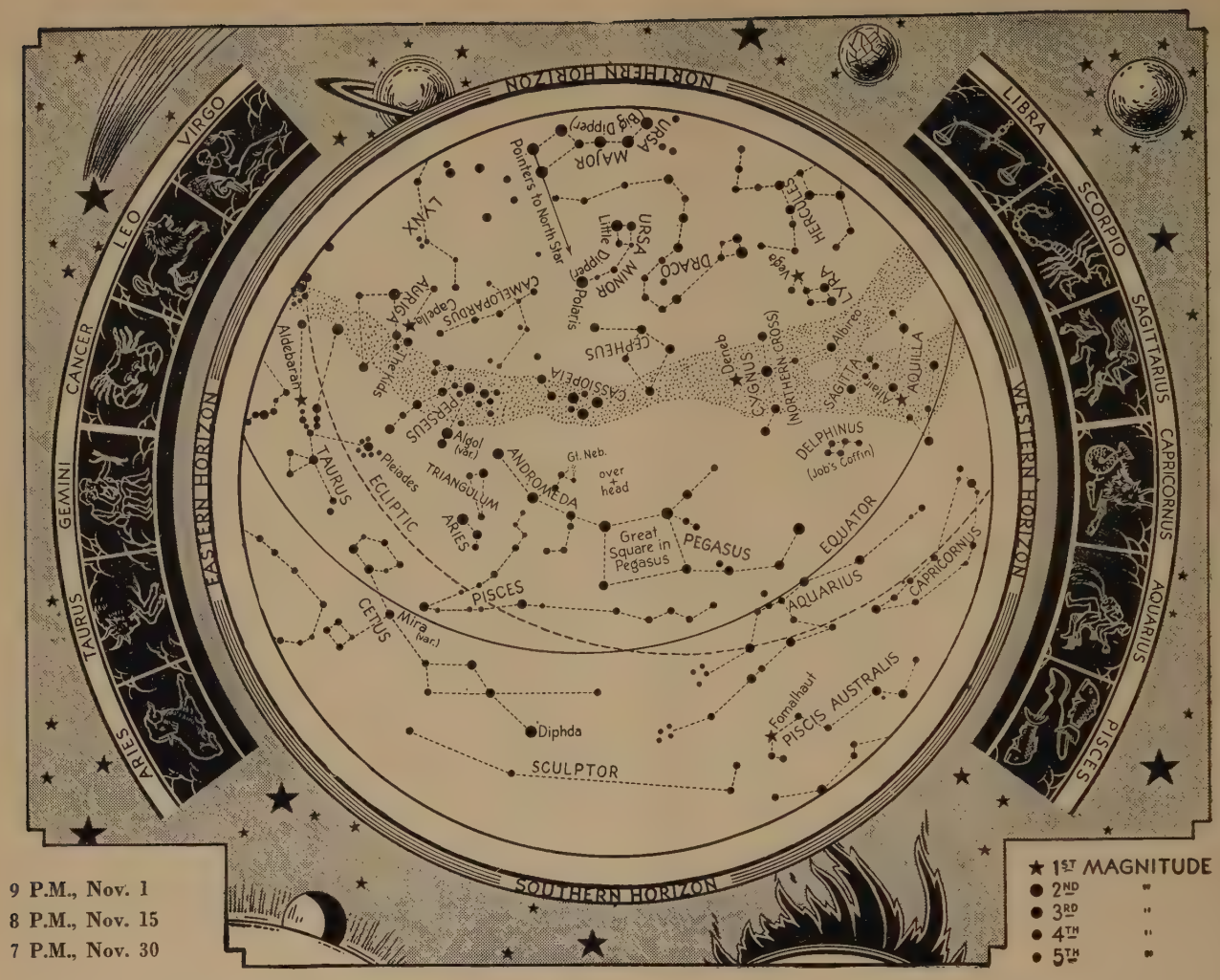
By PAUL CHURCHER

The wampum records are wind-blown ashes . . . the long-house crumbles on the hillside . . . the endless river of the seasons flows on. Quietly, in some forgotten forest aisle, the tasseled Corn God sleeps. The Red Man is no more; yet, in geographic names, his words are on our waters, not to be washed out.

For how many of the Indian words below can you choose the proper meaning from the column at the right? Score 10 for each one correct. 50 is fair; 70, average; 90, excellent. Yes, it is possible to make 110. But unless you are an ex-papoose, we will bet against it. Answers on page 498.

1. Adirondacks
2. Assiniboine
3. Chesapeake
4. Alabama
5. Yosemite
6. Missouri
7. Minnesota
8. Kentucky
9. Saratoga
10. Shenandoah
11. Idaho

A. Great Salty Lake
B. Great Muddy
C. Burnt Clearing
D. Land of Sky Blue Waters
E. Leaf Eaters
F. Jewel of The Mountains
G. Dark and Bloody Ground
H. River of The Spruces
I. Valley of The Grizzly Bear
J. Stone Boilers
K. Place Where Ashes Float



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

New Satellites for the Earth

By ISABEL M. LEWIS

NOW THAT the possibility of shooting rockets to the moon is an accepted fact, some astronomers are entertaining the idea of providing us with new satellites. These would be meteoric in size, to be sure, but would be considered celestial objects and satellites of the earth after their escape from its surface.

If an object is propelled horizontally from the earth at a height so great that there is no atmospheric resistance, and with an initial velocity of about five miles a second, it will revolve continuously around the earth in a circular orbit in a period of 1 hour 24 minutes, returning at each revolution to the point of initial departure. If the initial velocity exceeds five miles a second, but is less than seven miles a second, the object will move in an elliptical orbit, and the width of the orbit and period of revolution will increase with the velocity of projection. The orbit will change from an ellipse to a parabola when an initial velocity of seven miles a second is reached. This is called the parabolic velocity, or velocity of escape from the earth. An object leaving the earth with this horizontal velocity, or at right angles to a line drawn from it to the center of the earth, would never return. It would leave the solar system unless it passed so close to a major planet that the shape of its orbit might be changed to that of an ellipse of very long period. If the initial velocity at which the object is projected from the earth exceeds seven miles a second it would still not return to the earth, but would leave the solar system, traveling along an orbit having the shape of a hyperbola instead of a parabola.

The velocity of escape from any member of the

solar system depends directly upon the mass of the body, and inversely upon its radius. If two bodies are of the same size, but differ in mass, it will be easier to escape from the less massive of the two; if the bodies are equal in mass, but differ in size, escape will be easier from the surface of the larger body. The velocity of escape of the sun is greater, of course, than that of any other body in the solar system. A particle at the surface of the sun would have to acquire a velocity of more than 483 miles a second to escape permanently from the surface of the sun. The velocity of escape from the moon, on the other hand, is only one and one-half miles a second, and for small satellites, such as the two satellites of Mars — Phobos and Deimos —, which are respectively only about ten and five miles in diameter, the velocity of escape is so small that if a man were able to get a foothold on either one of them he would have no difficulty in jumping off into space. It is the low velocity of escape of the smaller bodies of the solar system, such as the moon and satellites of the major planets, that has gradually stripped them of any atmosphere they may have originally possessed; for the molecular velocities of atmospheric gases exceed the velocity of escape of these small members of the solar system.

Any object ejected from the earth with a velocity less than five miles a second would fall to its surface eventually. A series of objects ejected with velocities from five to seven miles per second returns to the same point after traveling in elliptical orbits of different sizes. The time of their return would depend upon the velocity of ejection. They would not fall to the surface of the earth but would continue to move around the earth in these orbits. It is doubtful if any objects escaping from the earth's surface, and becoming satellites in this manner, would ever be of sufficient size to be seen.

It is quite possible that the earth already possesses a great number of minute meteoric satellites revolving around it at various distances, and in periods of revolution ranging from a few hours to a number of days. They may be inside of, or, if the period of revolution exceeds a month, beyond the orbit of the moon. They could not exist within 100 miles or so of the surface of the earth without being consumed by friction with its atmosphere. Meteors usually flash forth to incandescence at heights of 60 or 70 miles, sometimes at considerably greater heights. It is doubtful if any satellite of the earth of meteoric size could revolve continuously around the earth even within 200 miles of the surface. Any man-made satellite ejected from the earth with an initial velocity of five miles a second, so as to move close to the surface in a nearly circular orbit, would probably soon fall to the surface in the form of meteoric dust as a result of atmospheric resistance. If ejected to a distance of several thousand miles, with somewhat greater initial velocity, a small mass weighing a number of tons, and exceeding in size the largest meteorites that have fallen to the earth, might revolve around the earth indefinitely in an elliptical orbit. It would, however, be more hopeless to look for it once it was launched on its career as a man-made satellite of the earth than for the proverbial needle in the haystack.

It is quite possible that our planet has a small dusky ring of meteoric particles revolving around it in equatorial regions, where such small masses could revolve around the earth in considerable numbers outside of its atmosphere without being observed. In addition to all the meteors and meteorites that penetrate the earth's atmosphere there are many more that pass by without revealing their presence, silent dusky objects nearly grazing the earth's atmosphere but safely outside it.

The zodiacal light that is so conspicuous in the tropics, often seen as a luminous band extending upward from the horizon to zenith, or, at times, arching completely across the evening sky along the ecliptic, is caused by the reflection of sunlight from numberless small meteoric particles that revolve around the sun in the plane of the earth's orbit. It is not unreasonable to suppose that a similar small ring of particles of meteoric origin may also surround our own planet, revolving around it in its equatorial regions.

November brings its usual swarm of meteors known as The Leonids, which may be counted upon to produce their greatest display in the early hours after midnight on November 13-15. Leonids move swiftly and are bluish in color.

A partial eclipse of the sun will occur on November 23, visible over most of the United States and Canada. It will not be visible in Alaska, or in the western and southwestern part of this country, or most of Mexico. In northwestern Canada the sun will rise more or less eclipsed. The greatest eclipse will occur in southern Greenland where about 78 hundredths of the sun's diameter will be covered by the moon at the time of maximum eclipse. Partial eclipses of greater or less magnitude will occur from Oregon, Washington, Wyoming, and Colorado, where the magnitude is only one- (Continued on page 495)

Starlit Night

By MARGARET S. HOSMER

I am exalted with the silver stars,
Pleiads and Hyads in their palomars
Above the eucalypts and deodars.

So many months the city's smoke and glare
Have dimmed the glimmer of the starry air
I could forget that they were shining there.

Now the clean rain has polished heaven bright,
Orion and Aldebaran are alight
And the big Dog Star climbing up the night.

The School Page

Edited by E. LAURENCE PALMER

Professor of Rural Education, Cornell University,
and Director of Nature Education, The American
Nature Association

GHOSTS, GHOST-WRITERS AND GHOST-RIDERS

THE IDEA for this article, destined to appear just before Hallowe'en, came to me in June. It is fun to think that some friendly wraith, zooming through space, paused to whisper it in my ear. But since he, or, more happily, she, neglected to sign off with any recognizable theme song I am compelled for the moment to accept the idea as my own. Possibly it was wholly due to some things that happened in June, and no wraith, or Miss Wraith, had anything to do with it.

At any rate, once I had decided to write the article, it seemed best to know more about the subject. This apparently is not a required attribute of being a ghost-rider. However, on the evening of July 3, I attended a meeting conducted by the Reverend Fred Mitchell, who advertised in our local papers that, for our enlightenment, he would hold a public meeting with at least one spirit of another world. I was duly requested to write a message to some departed friend, with the understanding that I might get an answer through the Reverend Mr. Mitchell, spokesman for the evening of his pet control, Cap'n. In due time I was informed that the spirit of my departed friend was standing on the platform, under the fluorescent lights, on Mr. Mitchell's left. The everpresent Cap'n stood to the right, and interpreted things to Mr. Mitchell, who interpreted them to me. All of this was interesting and I enjoyed it. It demonstrated that Mr. Mitchell could read my handwriting, a fact many a kindly ghost-writer friend has indicated is no mean accomplishment. [Verily! Ed.] But it also demonstrated that either my six-foot departed friend had lost weight in his new form, or Mr. Mitchell missed something when he reputedly put his hand on my friend's shoulder. When Mr. Mitchell asked me if I believed my friend stood beside him I told him frankly that I did not. Whereupon I was told, in no uncertain terms and before the assembled multitude, that I was doomed to spend many an unhappy day in purgatory after I left this earth.

I was not particularly concerned about this intimate association that Mr. Mitchell assured me I might have with another world, and I did not in the least resent Mr. Mitchell's indictment of me. I thoroughly respect his right to believe as he said he believed, although, honestly, I do not believe that he believed it himself. I did resent this authority on mundane matters, such as telling a seventy-five year old gentleman that he should ignore completely the diet and medicines recommended by his doctor and seek a happy old age through the use of water and Mr. Mitchell's philosophy. Fortunately, the gentleman was stubborn, and, after getting the Mitchell advice, willingly followed his doctor's strict regimen, which he had previously ignored whenever possible. And so, so far as my views on wraiths, ghosts and spirits are concerned, I enjoy the whimsical whisperings of wraiths, who I know exist only in imagination. I do not take seriously the statement of anyone, so far, who claims to be in direct contact with spirits. I thoroughly resent the tendency of so-called "authorities" to impose their views, or to speak with assumed validity to an ordinarily credulous public. And what goes for ghosts goes equally well for ghost-writers, and for ghost-riders.

Possibly because I have myself been a ghost-writer many times, I do not thoroughly object to the existence of the genus. They have helped me many times. Many a beginning writer has learned to write, and to continue to eat in the process, through the sale of his efforts signed by "big names." At least, the ghost-writer is willing to do some work in these days of a cockeyed labor philosophy which apparently little respects work of quality. I doubt that we will ever have a comprehensive union of ghost-writers because too many of the members would want to work for the sheer joy of working, a blessing which seems to have missed many now taking a part in our increasingly regimented way of living.

Such resentment as I have for ghost-writers dates from a time when a ghost-writer sent me for approval a page proof of an article he had written under my name and a notation that I would receive a generous check for the same. I never even finished reading the article, I never got the check, and I never again have been bothered from that particular source.

But there are good ghost-writers, hosts of them, and even you may be one although you do not know it. They are the people like Dick Westwood, who edits *Nature Magazine* and these articles; my assistant, Eva Gordon, who reads much of what I write; my stenographer, who never hesitates to express her opinion of some ideas I express; Mrs. Ely, our housekeeper, to whom I read most of the popular articles I write; my wife, who, with the others, does not hesitate to tear into my efforts with shears, ink and opinion, leaving the original material sometimes almost wholly unrecognizable but admittedly superior. It includes you readers, who write me your opinions of these articles, and help mould my philosophy thereby. All these people make my world go around. They are willing to work. They catch boners and hurl them back with deadly accuracy, and, usually, with an unwarranted apology. Dick Westwood and I are still wondering what in the world I meant by one sentence I wrote in the original manuscript of the special insert on shore birds. We probably will be laughing about it for a long time. [It was a beauty! Ed.] I am sorry that I cannot share it with you as I might share the boners I have found in the writings of friends that have been submitted to me for criticism. I say I might share these boners with you, but if I ever do it will be on an impersonal basis. And so, with ghost-writers as with ghosts, there are some we do not take seriously, some we like and others we resent. The same hold for the ghost-riders.

The ghost-rider, of course, is the guy who lets someone else do the work for him while he takes the credit, and a generous portion of the profit. *If he does his fair share of the work* I am sure that he is a useful institution, but if he does little or none I am sure that the world would be better without him.

A few years ago one of my friends "wrote" what seemed to be a very creditable book. I enjoyed it so thoroughly that I praised him for it at a large professional meeting, mentioning particularly one section on which I think I had some right to pass judgment. The man rose, bowed graciously, accepted my remarks and thanked me both publicly and privately for them. Imagine my surprise in June, years later, when I started this article, to learn that one of his students had written a major part of the book, in fact, the whole section that I had so wholeheartedly praised. I find no adequate reference to this contribution in the introduction to the book, and at no time, in private or public, has the big name indicated to me that he did not produce personally the work I praised. I must, and do,

assume that much of the other material that has appeared under his name was done by others. In a way this should help his reputation, since it means that he probably did not write some of the tripe that has appeared under his name, and for which I have, in the past, held him wholly responsible. Unfortunately, if I accept this way out to defend the reputation of this ghost-rider, it must mean that he did not take the time to read what he was supposed to have written, or did not have the ability to evaluate material to which he was willing to lend approval by the use of his big name.

In many ways the relation of these big name ghost-riders to society may be just as vicious as might have been the influence of the Reverend Mr. Mitchell in advising an old man to ignore his doctor. Teachers and others have a right to expect that those who have places of influence should be willing to give good, honest work to make their contributions significant. They have a right to expect that a university professor of science education may have had at least one college course in science, although I know of one who boasts that he never had a college credit in science, despite his doctorate in science education. It is these super-fakers, unwilling to prepare themselves for the places of influence they hold, and unwilling to work to receive the praise that may come to them because of their position, who are really to be criticised. I could be personal in the matter, but it is the system that I oppose, and it is at the system that this criticism is directed.

I like to hear and to tell ghost stories. I like to have editorial ghost-writers jump down my throat, but I do not like to be imposed on by lazy ghost-riders no matter how big their names may be. I may sometime be a ghost in purgatory. I have been a ghost-writer of sorts, but I never have been a ghost-rider, and I hope I never shall be one.

"Rail" Birds

Hemmed in by tracks and shops of the Somerville Yard of the Boston and Maine Railroad, is a marshland, once known as Nunnery Hill, a famous Boston landmark. The marsh has become a sanctuary for ducks, pheasants and other birds, which, undisturbed by the confusion and clatter of a railway yard, are the special concern of the workers. Grain is swept from emptied cars, or brought in pockets by the men, and lunches are shared with the birds. Pet of the sanctuary is "Dolly," a mallard that has returned for eight successive years to raise her young. She arrives in early spring, hatches her brood and, in June, takes them across the tracks to Miller's River for their first flying lesson. Pheasants are year-around residents, and crows, sea-gulls and pigeons drop in for visits.

NEW SATELLITES FOR THE EARTH

(Continued from page 493)

of two-tenths of the sun's diameter, to Arkansas and Louisiana, where it is slightly more, and to the eastward where the magnitude of the eclipse is greater. The southern limit of the eclipse passes through Texas where little if anything will be seen of the eclipse.. At Washington, D. C., half of the sun's diameter, or 51 hundredths, to be exact, will be covered by the moon at time of greatest eclipse, which will occur at 12:22 P.M.. The eclipse will begin there at 10:50 A.M. and end at 1:55 P.M. Eastern Standard Time. The greatest eclipse in the United States will occur in the New England States. At Boston the magnitude will be six-tenths of the sun's diameter. There the middle of the eclipse will occur at 12:30 P.M. In the Central States the eclipse will occur earlier and the magnitude will not be so great.

No planets will be seen to advantage in the evening sky this month. Mercury will be in inferior conjunction with the sun on November 21. It will then pass to the morning sky, and may possibly be picked up in the morning twilight at the end of the month. Venus will be in the evening sky until November 17, when it is in inferior conjunction with the sun. It will be a thin crescent when viewed through the telescope early in the month, and, although a brilliant object, will be close to the horizon. Venus will disappear in the southwest in the glare of the setting sun before the middle of the month and will next be seen in the morning sky. It will move so rapidly away from the sun that by the end of November it will be seen as a brilliant object well above the southeastern horizon at sunrise.

Mars will be too close to the sun in the evening sky for observation through the month. Jupiter is now in the morning sky, coming into conjunction with the sun on the last day of October. It will be too close to the sun to be seen early in the month, but by November 30 it will rise in the southeast about two hours before the sun. Saturn is now in Cancer. It rises before midnight and has passed to the west of the meridian before sunrise.

Fur Animals

For the past seven years the U. S. Fish and Wildlife Service has carried on cooperative work with breeders of fur animals in matters of breeding, nutrition, management, disease and parasite control. This activity has now been transferred, by act of Congress, to the Bureau of Animal Industry of the U. S. Department of Agriculture. Included in the transfer is cooperative research work in several states.

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Camera Trails

By EDNA and BILL EVANS

SOUTH OF THE BORDER

WHILE THE vacation season is long since over for most of us, now is the time to begin dreaming of the things we will do and the pictures we will take when those precious days of summer freedom roll around for us again. For that reason we are devoting this camera section to an account of photographic experiences during a summer visit to Colombia, Ecuador and Venezuela.

"See America First" has long been a slogan in this country and now, with sea transportation opening up again and air transportation better than ever, the slogan might be broadened to "See the Americas First."

This past summer thousands of residents of the *Estados Unidos* (we in the United States certainly cannot claim to be the only "Americans") did trek south of the border to Mexico, Guatemala and other Central American countries, or journeyed farther south to *America del Sur*, that great continent that lies so attractively close to our own southern doorstep. More and more *turistas* will go there in the years to come, and we hope those travelers will help to build a real "good neighbor" feeling.

South America is a photographer's paradise. The scenery, the people, the plant, animal and bird life beggar description. True, the cameraman feels completely inadequate when he realizes the utter futility of trying to capture, on a small piece of film, the breathtaking grandeur and the mighty sweep of the Andes. In the dank shade of the jungles the light is too dim for pictures, while on the sunbaked deserts the light is almost too strong. But there are plenty of pictures to be made in regions between these extremes.

South Americans like to pose for pictures. Rarely will they refuse a request. Nor is there the outstretched palm for a peso, a sucre or a 'liver. In Mexico, alas, the picturesque people have found their very picturesqueness to be a source of revenue. They will pose—but usually for a price.

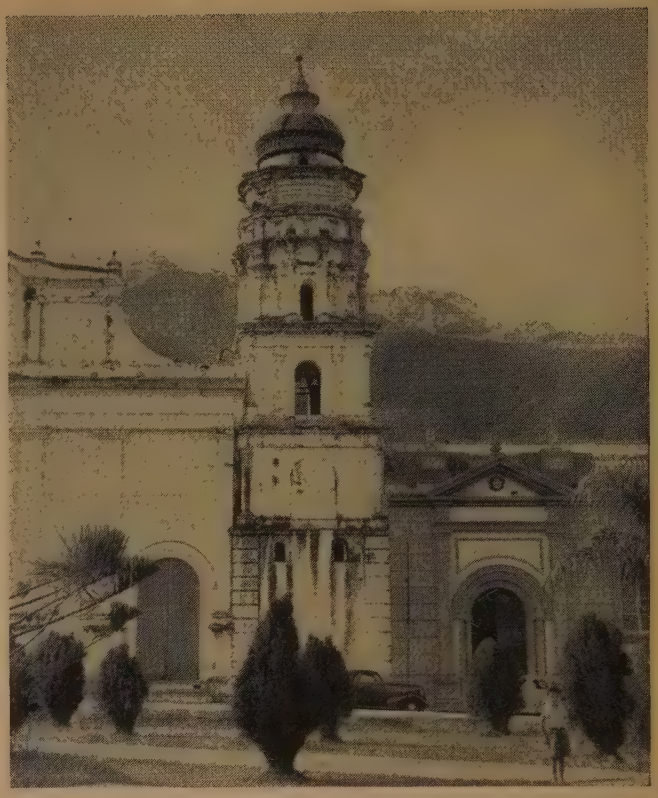
In South America, on the other hand, the photographer need only unlimber his camera and he finds himself literally surrounded with both youngsters and adults. Let him focus on some building or scene and up pops a head, right in the middle of the ground glass. Sometimes the spectators cluster so thickly in front of the desired picture that there is nothing to do but close the camera and go away, to return later during the siesta hour when nobody is around. Not that the people intend to get in the way—for South Americans are extremely polite. They are just interested, and since most of them know little about the intricacies of photography, they have no idea they are interfering.

Our own experiences would cover pages but, since we are writing for fellow camera fans, we will skip the experiences and instead confine ourselves to practical things like film and supplies.

We made our trip at a time when film was still hard to get. In fact, 4 x 5 film packs for the Graflex were well nigh unobtainable. Only after numerous letters to various supply houses were we able to get six precious Kodak Super-XX packs. That made possible exactly seventy-two pictures, provided we did not miss any, and we hoarded that film for special shots. A 616-size Kodak and a 35-mm Argus were used for less important work.

"Tropical pack" film was out of the question—nobody had any. And, Eastman warned us, we should not count on buying any film in South America. We might find it, and again we might not. Nor would the young man in the Tampa, Florida, camera supply store agree to send us film, even if he should be fortunate enough to get a shipment of film packs.

"It would be too hot down there," he said. "The film would be spoiled by the time it reached you."



Deep green mountains, topped by gray crags that have snow in their pockets, form the background for this 17th century cathedral in Merida, Venezuela. Numerous airplants have blurred the contours of the tower, while the young spectator in the corner is quite characteristic. South Americans are fascinated by cameras.

Later on, when we were shivering in damp, chilly Bogota, wearing all the clothes we possessed while crossing the equator by bus, and continuing to shiver under the sunny skies of Quito, where five snowcapped mountains are visible from the airport, we chuckled over the Tampan's statement. Too hot, indeed! The tropics are not necessarily steaming infernos.

Our ordinary pack film stood the climate well. Later on, when it traveled under a tarpaulin atop a Venezuelan bus, across deserts and under the equatorial sun, we did worry. We worried especially when the bus lost a wheel and we waited for hours in the heat for it to be put on again. But the film came through in fine shape, traveling snugly in our suitcase, through snow and deserts. "Tropical pack" is not absolutely necessary, we found.

As for film down south, we were amazed at the number of "Kodak" signs we saw, even in the smaller towns. Tailor shops might carry a line of film, or stationery stores—but never drug stores. The South American *botica* sells medicines and nothing else. In more normal times, when trade has caught up with itself again, we have no doubt but what the camera fan can find all the film he needs in South America.

Even this past summer we found surprising amounts of it. In Bogota, where the climate is anything but tropical, we found 616 film in "tropical pack." There was plenty of 35-mm film both black-and-white and color, as well as other sizes of roll film. But Eastman spoke true in regard to film packs for we asked for "*quatro por cinco* feelm packs" everywhere. "*No hay*."

Since we were accustomed to taking pictures under the Florida sun, exposures under the tropic skies gave us little trouble. We found we were more apt to stop the lens down too far rather than over-expose. Some distressingly thin negatives show the fallacy of this.

So, North American, forget your preconceived notions of the heat and intensity of the tropic sun. It may be neither as hot nor as bright as you have expected. Remember, altitude makes a difference in temperature, and most tourists routes follow the crests of the mountains. It is only when

Only a color picture could do justice to the patterns of delicate green on the mountainsides. Each field has a different tone and all blend into a design that is breathtakingly beautiful, especially when contrasted with the mellow colors of old cathedral towers and the weathered red of tile roofs. This is a scene in Pasto, Colombia.

you plan a lengthy stay in the "hot country" that you need to worry about specially packed film. An exposure meter will save you trouble with light intensity but, even without one, good judgment will prevent too many mistakes.

So far as customs inspections are concerned, peace times have removed all difficulties in connection with picture taking. No customs or other official in any of the three countries we visited asked a single question about our cameras or our supplies. We brought the film back, exposed but undeveloped, and there were no objections.

On the other hand, because of the foreign-made lens on the Graflex, we made a special point to register its number with the U. S. Customs before leaving the country. Otherwise, we might have had difficulty in proving it had been bought in this country, and duty on it would have been considerable. So, cameraman, if you have any foreign-made equipment, be sure to account for it before you go, and hang on to that important paper until you come back.

There are many other things we might say about the trip, other "kinks" we might mention. But all travel tales become boring if continued too long. So, instead, let us say we will be happy to try and answer direct any queries our readers might have about picture taking in the parts of South America we have visited. A letter addressed to NATURE MAGAZINE will reach us.

THE MAIL BAG

While we were gone a number of announcements arrived from manufacturers concerning new equipment and supplies.

Pavelle Color Incorporated, 533 West 57th Street, New York 19, N. Y., reports it can now offer 8 x 10 color enlargements for $3.00, including mount, and 5 x 7 color prints for $2.00. These can be made from all sizes of sheet and roll color transparencies, up to and including 4 x 5, although for a time the 8 x 10 size will not be made from 35-mm or bantam size transparencies.

The Wabash Corporation, 345 Carroll Street, Brooklyn 31, N. Y., announces a portable model of the Electroflash, designed especially for work where a flash is necessary. The outfit, complete with batteries, will supply the power for a hundred and twenty-five flashes before recharging, while a portable AC charger makes possible overnight recharging. It can be plugged into any AC socket or charged from an automobile battery. Wabash bulletin No. 323 tells about it.

The Eastman Company has issued new editions of three of its data books. They are *Formulas and Processing, Slides* and *Kodak Papers*. Each sells for twenty-five cents and all are punched for inclusion in the "Kodak Reference Handbook." A revised edition of the pamphlet *Kodak Microdol Developer* is offered free to photographers writing to the Sales Service Division, Eastman Kodak Company, Rochester 4, N. Y. Mention NATURE MAGAZINE.

For miniature camera fans, and especially members of the Leica "family," is the "Leica Information Bulletin" published by E. Leitz, Inc., 304 Hudson Street, New York 13, N. Y., and sent free to all Leica owners.

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BACK—OR FORWARD—TO NATURE

(Continued from page 460)

to Nature's methods. In agriculture, we are slowly learning how to draw our sustenance from the soil without destroying it and turning whole districts into barren wastes; the more advanced our agriculture, the less land we need bring under cultivation to produce a given quantity of food, the more forest we can preserve. In forestry, we are discovering that the best practice is that which interferes least with the natural growth and reproduction of the woodland. In nutrition, we are having our eyes opened to the fact that natural foods are more healthful and economical than foodstuffs elaborately processed, with the waste of great quantities of substances necessary to our physical well-being. Medicine, which not long ago was infected with such distrust of Nature that doctors spilt the life-blood of patients who most needed it, has now made an ally of Nature with a hundredfold increase in power. As jurisprudence is perfected, laws become less arbitrary; we see more clearly that they are for the common good, and obey them as scrupulously in the wilderness where there is no one to watch as in the city under the eyes of the policeman. As technology progresses, we enjoy on lonely farms and homesteads many of those advantages, as electricity, rapid communications, music, which a short while ago were to be had only by living in crowded cities.

Amid the forests, one is profoundly impressed by a truth that economists have long known—that in our efforts to gain time for the cultivation of the higher values by the simplification of our lives, we may go too far. The most effective means of diminishing labor yet discovered is through its division. If every man had to perform for himself, with his own hands, all the tasks necessary for his daily existence, it is probable that no book would ever have been written, no picture ever painted, no difficult scientific investigation brought to an end. It takes no longer to boil the beans for ten persons than for one. To go forward to Nature we shall undoubtedly need to simplify our lives, divesting them of all the empty noise, the gaudy fluttering tinsel, the aimless and profitless rushing about, which now devour our time and wear out our energy; but looking squarely upon those fundamental requirements of human existence that can be most easily satisfied by giving more rather than less attention to scientific and organized methods of production.

We still have a long way to travel to reach Nature by the forward path, and there is danger that before attaining our goal we shall have mutilated her out of all recognition. But here and there one detects a hopeful sign that we are on the right road.

[Just as this issue was about to go to press with this article, Dr. Skutch dropped in to see us, on the eve of his return to Costa Rica. He is working on a popular book on the birds of Central America.—Ed.]

VICUNA!

(Continued from page 472)

easy task. The vicuña has eyes that rival those of the pronghorn and, aside from the *ychu,* or *jarava,* grass that he loves, and the low, resinous *tola* bush, there is little vegetation in the Andes to obscure his line of vision. But his best defense is the rarefied air of the heights at which he lives. He is thoroughly acclimated to the altitude, as his hunters can rarely be.

He shares the heights of the Andes only with the guanaco and the ñandu and condor. Just as the latter is lord of the rarefied skies over the tremendous peaks, so is the vicuña king of the mountains themselves. I like to think of them best by remembering one I saw in Bolivia.

A friend and I had been riding mules all day until, just at sundown, we neared our destination. We were almost exhausted, but even so we looked with appreciation as the setting sun enriched and deepened the coloring on the long ridge to our right.

Suddenly, as we watched, a vicuña stepped out on the skyline, scarcely fifty yards from us. He stood in profile. The waning sun deepened the orange-brown of his coat and cast a glitter over it so that he appeared as a statue made of the richest gold of the Andes.

And then, with a single bound, he disappeared, and the shadow of approaching night darkened the spot where he had been.

THE BIRD EXPLORERS

(Continued from page 464)

not all bird discovery ended with the beginning of the twentieth century. The West and some other parts of the country contained a great many subspecies of birds overlooked in the earlier days. Subspecies have been added one by one to the list: a least bittern by Charles B. Cory; the Brownsville thrasher by Harry C. Oberholser; the Florida night-hawk by Frank M. Chapman, and many others. There came a time, at last, after the Cape Sable seaside sparrow was discovered by A. H. Howell in 1918, when it would seem that all the American birds had been found and named; that there was no chance of new discovery. Yet, in 1939, adventure opened once more its alluring doorway. In that year, J. Lloyd Poland and Karl W. Haller of West Virginia University, birding in the mountains of West Virginia, heard a new song and found a new bird. It was a hybrid warbler that now bears the name of still another great American bird man, George Miksch Sutton.

Yet even though the chance of finding a new bird is now admittedly remote, the thrill of discovery remains constantly with us. Each spring eager birders, armed with binoculars and bird guides, go afield. They find new songs and pursue birds that, to them, are excitingly new. Inquiring Mark Catesby and earnest John Audubon may have known the incomparable sensation of actual discovery, but this sensation is not dead. It lives on in each birder and in each new bird seen. Back of them, benevolently stand the birdmen whose names and whose efforts in a once dangerous land comprise the American bird list today. In simple, uncommunicative names lie high drama, personal accomplishment, the love of birds, and vivid chapters in the story of America.

ANSWERS TO "INDIAN NAMES" QUIZ

1. Adirondacks—*Leaf Eaters.* A word with which the Iroquois taunted the Algonquins, whom they had driven into the mountains, implying that they could eat leaves or starve.

2. Assiniboine — Literally, *They Who Boil Stones.* The clans who lived along this Canadian river had no pots that would withstand fire, so they made a fireless cooker by dropping hot stones into the water.

3. Chesapeake—*Great Salty Lake.* For a long time the Indians did not know that this bay was an arm of the ocean.

4. Alabama—*Burnt Clearing.* Named for a tribe of the Creek Confederacy who were known as "Thicket Clearers" from their practice of burning off the underbrush around their villages.

5. Yosemite—*The Valley of The Grizzly Bear.*

6. Missouri—*Great Muddy.* The complete translation would be "Great Muddy River of The Yellow Smoke." In flood times its silt-burdened current threw a spray into the air, a towering line of "Yellow Smoke" visible for miles.

7. Minnesota—*Land of Sky Blue Waters.* 10,000 lakes, no?

8. Kentucky — *Dark And Bloody Ground.* This was an uninhabited region rich in game where rival tribes hunted and fought.

9. Saratoga—*Place Where Ashes Float.* Linguistic awareness of the high specific gravity of Saratoga's Mineral Springs.

10. Shenandoah — *The River of The Spruces.*

11. Idaho — *Jewel of The Mountains.* From the Shoshone "Ee-dah-how!" ("Behold! The sun comes down the mountain!")

THE READER'S MARKET

A place where members of the American Nature Association and readers of Nature Magazine may find many interesting offerings, or may advertise themselves, at low cost, for things wanted; things they have for Sale, for Trade, for Sale or Trade. This is an excellent forum for acquiring or disposing of such items as binoculars, books, cameras and photographic equipment, magazines, sports and outdoor equipment, etc.

GENERAL REQUIREMENTS APPLICABLE TO CLASSIFIED ADVERTISING

1. *Transactions based on good faith:* Transactions are based on good faith and mutual satisfaction. Deliberate misrepresentation, disregard of usual business ethics or the attempt to circumvent these general requirements, when brought to our attention, will result in refusal of further advertising.

2. *All orders subject to these conditions:* We reserve the right to edit all copy to conform with our standards and to reject or discontinue any advertisement which we consider undesirable.

3. *Who may advertise:* This department is an open market trading post. Any individual or firm whose advertisement and methods of doing business meet our requirements may advertise their goods or services.

4. *Rates:* All classified advertisements must be accompanied by remittance. The rate is 15c per word including name and address—minimum charge $2.00. Cash with order.

5. *How to count numerals, etc.:* Groups of figures are counted as one word. Abbreviations consisting of initials or single characters likewise are counted as one word. Hyphenated words are counted as two words.

6. *"For Sale" ads must state prices:* A specific price must be stated on all FOR SALE ads —except that the phrase "write for catalog" may be used when listing real estate or merchandise in quantities.

7. *Conditions of trade or sale:* The condition of binoculars, cameras, instruments, other equipment useful to outdoor lovers, home-owners, etc., advertised for sale or trade must be specified as follows: PERFECT—meaning factory condition; EXCELLENT—meaning new condition, implying negligible amount of use; VERY GOOD—meaning practically new condition, implying little use, with no appreciable wear and only minor surface scratches or wear; GOOD—meaning moderate condition and with only moderate wear; FAIR—meaning no parts missing necessary to use, reasonable wear inside and out; POOR—meaning marred appearance or badly worn.

8. *Non-specific phrases barred:* Phrases such as "highest" or "top prices paid", as well as any other so-called "auction-type" phrases are not acceptable. The terms "fair price paid" or "state price wanted" may be used.

9. *Blind ads not acceptable:* Box number or blind ads will not be accepted. Give your complete name and address to insure prompt delivery of all mail or telegraph replies.

10. *Requesting privilege of examination:* Purchasers desirous of examining merchandise before acceptance should request shipment by express C. O. D. with examination privilege. This procedure permits the purchaser to inspect the merchandise in local express office and authorizes the express company to return unsatisfactory merchandise at shipper's expense.

11. The association will not accept for publication in NATURE MAGAZINE, advertisements of firearms, ammunition, or patent medicines.

12. *Responsibility for illegible copy:* Type or print advertisement plainly as we cannot be responsible for errors due to illegible writing.

13. *Closing date:* The closing date of all advertisements is the 20th of the second month preceding month of issue.

AUTOMOBILE

1946 SUPERIGNITIONITER $5.50. Atomic starting, Pep, Mileage. E. G. Mfg. Co., 355U East 149th St., New York 55, N. Y.

AUTOMOTIVE

GASOLINE SAVING devices, 1933-1946. Write for list and prices. Warlert, 3429 North 10th Street, Milwaukee 6, Wisconsin.

BINOCULARS

BINOCULARS REPAIRED: All makes foreign and domestic; cleaned, repaired and collimated; forward glass for estimate. Time 2 weeks. Md. Precision Instrument & Optical Co., 11 & 13 E. Twenty First St., Baltimore 18, Md..

BIRDS

WILD GEESE, Ducks, Peafowl, Pheasants, Pigeons, Rabbits. Prices free. Jewel Game Farm, Danville, Illinois.

BOOKS

"READY ON THE RIGHT"—a Seabee-Naturalist's true story of adventures from the Aleutians to Okinawa. 200 pages; cloth; gold stamped; halftones and maps; dust jacket. Order from author. $3.00 postpaid. Ralph J. Donahue, 515 West 11th, Kansas City 16, Missouri.

PONTIUS PILATE'S REPORT TO CAESAR ON CHRIST'S CRUCIFIXION. Remarkable document. Also gives conversation between Christ and Pilate. Publishers, 717A South 17th St., La Crosse, Wisc.

"HOUSEHOLD STREAMLINERS"—Over 760 ways to make housework easier. Ideal Christmas gift. $1.00 postpaid. Free literature. Adirondack Press, Potsdam 8, N. Y.

BIRDS AND FERNS of El Paso, on Mexican Border. Birds, $1.00, Thirteen Ferns, 75 cents; 56 pages, illustrated. Elsie McElroy Slater, 516 Prospect Avenue, El Paso, Texas.

National Geographic, Nature and Desert Magazines bought—sold—traded. Jack Heller, P. O. Box 2507, Los Angeles 53, Calif.

NEW MAGAZINE ADVANCE, 25c copy; year's subscription $3.00. Books. Magazines. Robert Martin, Nat. 57 Hart Street, New Britain, Conn.

NATIONAL GEOGRAPHIC MAGAZINES 1888-1946, any issue. Periodical Service, Box 327-N, Swarthmore, Penna.

Join the HOWELL MOUNTAIN BUTTERFLY CLUB! Enjoy the thrill of exchanging ideas and specimens with other amateurs. Annual dues, 50¢. Beginners should also have STARTING YOUR BUTTERFLY COLLECTION, price 10¢. Address Evelyn Gilstrap Williams, Sanitarium, California.

SECURE your out of print and second hand books from The Audubon Book Service, 415 Lincoln Ave., Brooklyn 8, N. Y.

BOOKFINDERS! (scarce, out-of-print, unusual books) Quickly supplied. Send wants. Clifton, Box 1377nm, Beverly Hills, Calif.

"WHOLESALE CATALOG, Directory" 10¢. Thousands of articles. Stafford Sales, Indianapolis 1, Indiana.

"BIBLE STUDIES." 70 lessons 25¢ complete. Bulletin, Box 87, Station H, New York 25, N. Y.

BULBS

GLORIOSA Rothschildiana lilies, gorgeous, exotic, flaming crimson and gold, long lasting corsage quality. Dozen large lilies per tuber. Grow indoors or outside. Large tubers prepaid sixty cents each, four for two dollars. Charmaine Gardens, Lakeland, Florida.

BUTTERFLIES

ASSORTED BUTTERFLIES from South America $1.00 per dozen. Brilliant Blue "Morpho Anaxiba" 60¢ each. "Yrama Riphaeus" considered most beautiful butterfly in the world $1.00 each. Collect butterflies or make your own butterfly serving trays, pictures, placques, etc., preserved miniature flowers or agrostis grass 50¢ per bunch. Artificial paper bodies 25¢ per dozen. Convex glass circles 6½" 15¢ each. Tray handles 35¢ pair. Butterfly mounts 4 x 5 inches 30¢ each. American Butterfly Co., 3457 Park Heights Ave., Baltimore 15, Maryland.

CAMERAS

CAMERAS REPAIRED: We repair properly and make replacement parts; Leicas, Zeissikon Medalists 2-3, Voigtlander, Alpha-Swiss, Artus, etc. Rapid compur shutters. Diaphragms, lenses cleaned and polished. Fine machine and optical work. Forward camera or microscope for estimate. Md. Precision Instrument & Optical Co., 11 & 13 E. Twenty First St., Baltimore 18, Md.

CHRISTMAS WREATHS

BEAUTIFUL permanent Xmas Wreaths, which can be used year after year, made out of Balsom Fir sprays, decorated with life like products of the virgin forest, treated and lacquered, the most gorgeous wreath ever made, 18" over all, prepaid each, $2.25; 6—$12.00. Brule Valley Nurseries & Evergreen Crafts, Brule, Wis.

DOGS

FOR SALE — DOGS OF THE HUNTING BREEDS. Coon, Opossum, Mink, Squirrel, Fox, Rabbit dogs. Judged by appearance. Ten days trial. Write for literature and conditions of sales. Prices reasonable. J. N. Ryan Kennel, Murray, Kentucky.

REGISTERED Brittany Spaniel pups and young dogs from natural pointing, hard hunting, shooting dogs. Walter Oberlin, DeKalb, Illinois.

COCKER SPANIEL puppies, championship bloodlines, registered, gorgeous coats. Mrs. D. J. Fallon. Spalding, Nebraska.

CLASSY Wire Fox Terrier pups. World's best breeding. Delivery guaranteed. Caswell Kennels, Toledo, Ohio.

BEAUTIFUL, useful Collie Shepherd pups $12.00. Paul Schultetus, New Liberty, Illinois.

IRISH SETTERS pups, grown dogs. Reg. Best blood lines. Bill Duncan, Weston, Mo.

QUALITY MAHOGANY RED Irish Setters our specialty, pups and grown dogs. L. R. Meyers Killarney Kennels, Berlin Heights, Ohio.

FIELD GLASSES

SKYSCOPE, the new 3½" reflector. Precision ¼ wave aluminized mirror. Sixty power Ramsden type eyepiece. Equatorially mounted on ⅜" iron pipe legs. Used by schools, universities. Price complete $19.75. Write for descriptive literature. The Skyscope Company, Inc., New York 17, N. Y.

60 POWER TELESCOPE, $2.95. 250 power microscope, $2.45. Also bargains in binoculars and surplus lenses. Send for free catalog. Brownscope Company, 24 West 45th Street, New York.

HOBBIES

EARTHWORM CULTURE. A fascinating hobby; profitable home industry. Write for valuable free bulletin-review on "Earthworms: Their Intensive Propagation and Use."—Thomas J. Barrett, Earthmaster Farms, Box D-488, Roscoe, California.

LEATHERCRAFTERS! Send for catalog listing leather, kits, supplies. KIT KRAFT, 1607 South Western Ave., Los Angeles 6, California.

VEGETABLE VOYAGERS

(Continued from page 488)

ently unknown today to most people of this country. It is still preferred to other squashes in many oriental regions, and varieties of it are used to make candy in South China and the Philippines.

Cucurbito pepo includes the thin-fleshed or watery forms known as pumpkins and summer squash, and also those with a pithy or hollow interior, when ripe, as the gourds. All these are now cultivated all over the world wherever the climate allows. The summer squashes are of several distinct types and are highly variable. Several European countries have developed distinct varieties, which are now widely grown in this country, such as Danish, vegetable marrow, zucchini. At the same time some of the much superior varieties developed by the Amerinds have been neglected or allowed to die out.

The tomato, *Lycopersicum esculentum,* is another gift from tropical Mexico and Central America, developed by the skill of red men of long ago. The name tomato is a corruption of the Nahuatl name, tomatl. For centuries the tomato was appreciated only in the tropics. Until about 1850 the people in most parts of the United States called it poisonous, but sometimes grew it as a curiosity under the name of love apple. It is now cultivated in tropical and warm temperate regions all over the world. In the United States tens of thousands of acres are devoted to its culture, while it is canned in enormous quantities. In most parts of the African, Asiatic, and Pacific Ocean tropical regions tomatoes have escaped from cultivation and run wild. The fruit of these wild plants is small and of little value.

At least two other species of tomato occur wild, and are also cultivated in Brazil and Peru. The currant tomato, *Lycopersicum pimpinellifolium,* is native to Peru and Brazil. The small fruits grow in bunches. It was introduced into the United States under the name of grape or cluster tomato, and it is grown in warm countries in various parts of the world, but its culture is not of much consequence. *Lycopersicum humboldti,* a native of Brazil, is cultivated there. The fruit is smaller than the common tomato but has a fine flavor. Its cultivation has made little progress outside its native country.

Several species of *Capsicum,* or red pepper, are cultivated, but only three are commonly grown. They are natives of tropical America, from the West Indies and Mexico, to Brazil and Chile, and were cultivated extensively in pre-Columbian times. One of them, *Capsicum annuum,* must have been cultivated since most remote times, as it is not known in a wild state. It has diverged into a number of radically different varieties, which are considered species by many botanists. In some of its various forms it is now cultivated all over the United States, and everywhere in the tropics and warmer regions of the world. Several varieties have been developed and become important crops in various countries, as paprika in Hungary, and the small, thick-fleshed peppers, which are canned in Spain.

Some of the peppers, especially *Capsicum frutescens,* were carried to the Philippines by the Aztecs and soon became naturalized. The Portuguese took them to India, where they likewise escaped from cultivation. *Capsicum frutescens* now grows wild throughout the Philippines, the East Indies, New Guinea, the Solomons, the New Hebrides, India, and parts of Africa. I have found it along native trails and on river banks far in the interior of islands, where only cannibals in the stone age live.

The cashew, *Anacardium occidentale,* is a small tree fifteen or twenty feet high. It is native to the West Indies, Guiana, Brazil, Panama, and Peru. The fruit and nut were both used by the prehistoric Amerinds. The superior quality of the nut attracted the attention of Europeans, so that the Portuguese took it to Africa, India, and the East Indies, and the Spanish to the Philippines. The tree became naturalized in India, and now grows wild there. It is also grown in extensive plantations, so that the main crop of cashew nuts now comes from India.

When the Spanish came to Mexico they found the natives drinking chocolatl, a name they corrupted to chocolate. The chocolate of commerce is made from the seeds of *Theobroma cacao,* a small tree cultivated in Mexico and Central America centuries before the time of Columbus. At least three other species of *Theobroma* occurred both wild and cultivated in Brazil, Guiana, the West Indies, and Central America. Chocolate was one of the first products of the New World to be taken to Europe, and was soon a household necessity for the Portuguese and Spanish. They carried it throughout the old world tropics and established it in all countries with a hot, humid climate. It is now cultivated commercially in Brazil, Portuguese West Africa, Ecuador, Central America, the Philippines, East Indies, and Venezuela. As it is rich in oil, starch, and protein, chocolate is food as well as drink.

The vanilla plant is a climbing vine, and the only representative of the huge orchid family that is cultivated for any purpose except as an ornamental. Vanilla was cultivated in Mexico and Central America in prehistoric times, and was used to flavor chocolate. The flowers must be hand-fertilized, a process that the people of Mexico and Central America understood a long time ago. The principal vanilla crop is now produced in Madagascar, and it is also grown in other islands of the Indian Ocean, such as the Seychelles. Other centers of production are Mexico, Tahiti, and Guatemala.

The Jerusalem artichoke is neither an artichoke nor does it come from Jerusalem. It is a sunflower with tuberous roots, and the name Jerusalem is the Englishman's corruption of the Italian name for sunflower, gira sol, "turning to the sun." The artichoke part of the name is pure, malicious invention. The plant is a native of what is now the eastern half of the United States, and was cultivated by the Amerinds centuries before the white man came. It was taken to Europe in early colonial times and soon spread over great areas there. It has long been extensively grown in China, and is important in the Ryukyu Islands. Its principal use is in feeding livestock, especially pigs, although in some places it is an important food crop for human beings.

The chayote is a native of tropical South America, where it has been highly esteemed as a vegetable since ancient times. It is now cultivated in south Florida, and in frostless areas in southern California. It is in our markets in season, but is not yet of much importance. When cooked it is much like some of our better kinds of summer squash. It is grown commercially in the island of Madeira, and in many places along the coasts of the Mediterranean. Its cultivation is steadily spreading.

Thus have these vegetable voyagers, for which the world is indebted to the Americas, traveled far and settled down as welcome immigrants, enriching human diets.

Bear Facts

A Word about Bears. By Ken Stott, Jr. San Diego, California. 1946. Zoological Society of San Diego. 20 pages. Illustrated. $.25. Fifty or more, $.20.

This is the first in a projected series of bulletins to be brought out by the Zoological Society of San Diego, Balboa Park, San Diego 12, California. It presents simple and popular text about bears and some excellent illustrations of the several species. A second bulletin, treating cats in similar fashion, is planned for early publication, or at least as soon as paper and printing presses permit.

Florida Forestry

With the employment of William F. Jacobs as executive secretary, the Florida Forest and Park Association plans an aggressive campaign to intensify resources education, foster forestry and park legislation, bring about state-wide forest fire control, back a state park and recreation program to meet public needs and preserve historical and scenic areas. These goals were announced by X. L. Pellicer, president of the organization, in turning over the executive secretary's post to Mr. Jacobs, a former assistant state forester of Florida.

HOBBIES

HARMONICA MAGIC. Easy new system eliminates notes. Self instruction method includes 75 songs. Send only 50¢ money back guarantee. Harmonica Magic, Dept. NM-1, Box 3445, Merchandise Mart, Chicago 54, Illinois.

LET'S SWAP! Whatcha got? Watcher hobby? Three times two dimes. Swapper's Hobby Bulletin, Royal Oak, Michigan.

TRACE your family history with "Guidex"! Literature free. Family Guidex, P. O. Box 829-N, Annapolis, Md.

MAKE MONEY with hobbies. Write Lant, 56 Teneyck Ave., Albany, N. Y.

ENTERTAIN with magic. Six tricks, lists and catalog, $1.00. Sterling Magic Company, Royal Oak, Michigan.

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MOVIE FILM, all kinds; cameras, projectors, supplies. Everything Photographic; Cameras, Films, Printers, Enlargers, etc. Goodwill Company, Jackson, Tennessee.

HOME STUDY

MASTER Russian at home in 100 hours. Guaranteed course, $1.50. Eugene Lerner, 15 East 208th Street, Bronx 67, N. Y.

LIBERAL EDUCATION for Modern Living. Also courses based on Harvard Classics. Winter vacation study on beautiful Florida campus also offered. University Foundation, NHV, St. Augustine, Florida.

HAND WEAVING teacher 30 years experience available to travel for classes. Robert Heartz, Epping, N. H.

INDIAN CURIOS

4 FINE ANCIENT Indian Arrowheads $1.00. Stone Tomahawk $1.00. 4 tiny bird arrowheads $1.00. Large flint skinning knife $1.00. List free. Lear's, Box 569, Galveston, Texas.

LISTS AND arrowhead 15¢ or flint spear $1.00. Williams, 212½ Pine, Green Bay, Wis.

MINERALS

"ROMANCE IN STONES." Arizona rare minerals. Collectors or museum grade, 12 miniatures, assorted, colorful, brilliant, genuinely rare, $3 Sam Parker, 2160 East Van Buren, Phoenix, Arizona.

10 All Different Diamond sawed cabachon blanks ready to grind and polish into ring stones, $2.50 postpaid. Minerals and gemstones on approval. Dr. Ralph Mueller, 3701 Valentine, Kansas City 2, Missouri.

MISCELLANEOUS

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PERSONALITY TESTS. Your strong and weak qualities revealed—also traits and characteristics—complete test and report with helpful suggestions, only $1.00. Send to National Testing Service, 25 Elliott Place, Dept. NM, New York 52, N. Y.

IDENTIFICATION is simple when you sew Arrow Washable Name Tapes on your clothes. $1.00 per hundred. Arrow Label Co., Box 31, Sta. P., Brooklyn 12, N. Y.

WORLD'S SIMPLEST METHOD! Hawaiian Guitar. Play songs first lesson. Guaranteed! Supertone Guitar given. National Studios, Exchange Bank Building, Spokane, Washington.

YOU CAN ENTERTAIN with chalk talks. Catalog 10¢. J. G. Balda, Cartoonist, Oshkosh, Wis.

MEXICAN-AZTEC FEATHERWORK Tropical Bird Picture cards. Samples 25¢. Bulletin Free. Mexican Products Company, 126 N. Main, Tulsa 3, Okla.

EARN MONEY AT HOME—Assemble colorful handmade jewelry! Free wholesale proposition. Hughes, 712 Kimball, Danville 18, Ill.

DON'T FEED SPARROWS. Make your trap that will catch thousands. Write for details. Roy Vail, La Grange 31, Indiana.

PHOTO CARDS. Assortment 25¢. List free. Defiance Lefferts, Box 121, Brooklyn 25, N. Y..

CROCHETED rick-rack lace for pillowcases, $1.00 pair. Helen Chuldt, Poynette, Wis.

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GUITARISTS' DREAM CHART: shows names; symbols; readings; enharmonics; diagrams; fingerings, 15 types chords; each on 12 roots; 72 principal chords; 57 chord positions; key to diagrams; SENSATIONAL! Only $1.00. Carol Music Chart Co., Box 21NM—Lefferts—Brooklyn 25, New York.

NATURE GAMES

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PETS

CROCODILES. Live baby South American Crocodiles. $8.00 each F. O. B. Welland. E. Teachout, 95 Young Street, Welland, Ontario, Canada.

RAISE GIANT CHINCHILLA RABBITS. Year round income. Ideal occupation. Tremendous demand for gorgeous furs, delicious meat. Great scarcity means large profits. We buy your youngsters. Willow Farm, R25, Sellersville, Pa.

PLANTS

GROW bean sprouts for market in dark room winter and summer. Quick returns. Literature free. Mrs. Nickell, R. #1, Box 456, Bend, Oregon

CACTUS RARE UNIQUE FROM WORLD ORIGINS. 10 for $1.00! Coover's, Orlando, Florida.

PHOTO FINISHING

TRIAL ROLL developed and printed 15¢. Work returned same day received. Foto, Box 837, Sandusky, Ohio.

CENTURY DELIVERS WORK and service that can't be beat. 8 exp. roll 25¢ with two professional enlargements FREE. Century Photo Service, LaCrosse, Wis.

DEVELOP your own photographs new system easy to handle. Complete outfit only $1.50. Home Sales, Box 12, Oaklandon, Indiana.

PRINTING

PRINTING MACHINERY, Type, Supplies. Lists 3¢. Turnbaugh Service, Loysville, Penna.

QUALITY PRINTING. Lowest cost. Price list free. National, 4012-D, Drexel Blvd., Chicago 15, Illinois.

75 LETTERHEADS with envelopes, beautifully printed, $1.00. Postpaid! Benneville Printing, Box 1931, Pittsburgh 30, Pa.

SEA SHELLS

SHELLS FOR SALE. Land and Marine; Cape Cod. Special 12 for $1.00 in box; Lists on request. Mrs. F. K. Hadley, Box 33, West Newton, Mass.

SCIENTIFIC COLLECTION West Coast shells 100 species two each $15., twenty species, $2. Check list west coast shells $1. John Q. Burch, 4206 Halldale, Los Angeles 37, Calif.

SCIENTIFIC EQUIPMENT

LABORATORY Supplies. Chemicals and Apparatus all descriptions. 36 page book 10¢. Standard Science Supply Co., 1232 N. Paulina St., Chicago 22, Illinois.

TEST WATER, soil and chemicals with Acid-Base Indicator Kit, mounted in portable wooden cabinet, with forcep tweezer. Meets American Chemical Society specifications. Postpaid $1.75. Microkit, Box 324, Jamaica, N. Y.

SMALL ANIMALS

MONKEYS, RACCOON, SQUIRRELS, pet stock all kinds. Cage Birds. Charune Animal Ranch, Burlington, Wis.

CATS MAGAZINE. Illustrated articles on all breeds. Five months, $1.00. Sample, 25¢. Cats, Room 766, 751 State St., Utica, N. Y.

SPORTING GOODS

AUTOMATIC BAIT—Positively weedless. Greatest invention in ages. Nothing like it. Circular free. Babcock Reel Co., Box 167A, Oak Harbor, Ohio.

SALESMAN wants to contact sporting goods firms wishing representation in Latin America. Frank Hudson, Box 1162, St. Petersburg, Florida.

3,000 BARGAINS, firearms, binoculars, war relics, catalog 30¢. John's Gunshop, Runnemede, New Jersey.

LEATHER PANTS, sheepskin lined, zipper front, U. S. Air Corp. issue attached elastic adjustable suspenders, warm, light, wind and rainproof. Reconditioned like new. Satisfaction guaranteed. All sizes $9.75. New York Clothing Co., Dept. NM, 2079 Second Avenue, New York 29, N. Y.

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STAMP COLLECTING

TRIANGLE SET 3¢ with approvals. Mallo, 767 Leith St., Flint 5, Mich.

TAXIDERMY

GLASS EYES Manufactured, Taxidermists' Supplies, etc. Free price lists. Schumacher, Halliday St., Jersey City, N. J.

GLASS EYES. Made in OUR factory. All kinds of Taxidermists' supplies. Complete catalog FREE. J. W. Elwood Co., 223 Elwood Bldg., Omaha, Nebraska.

BIRDS, ANIMALS, and Fish mounted true to life by Osmer D. Cole, R. 1, Box 179, Wisconsin Rapids, Wis.

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(Left) Median l.s. of rat kidney, magnified 8 times (32 mm microtessar) and, (right) cross section of injected kidney, 10X, showing cortex with glomeruli (black dots) and medulla.

Under the Microscope

By JULIAN D. CORRINGTON

THE PHOTOMICROGRAPHS FROM SLIDES COURTESY OF WARD'S NATURAL SCIENCE ESTABLISHMENT

INSPECTING THE KIDNEY

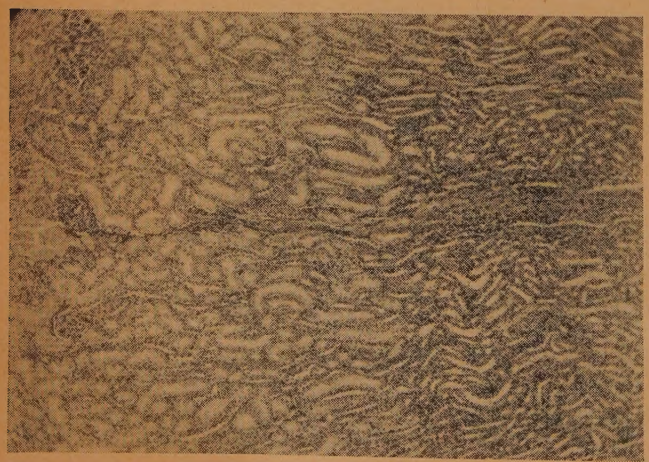
Most people take their internal plumbing system for granted—until something goes wrong. Then the kidneys loom as of the utmost importance. When we burn up our living substance in order to release energy to do work, there are always organic residues that must be gotten rid of. Otherwise we poison our own body and our associates will know us no more. Such a bodily waste is urea, manufactured in the liver and sent via the blood stream for elimination by the kidneys.

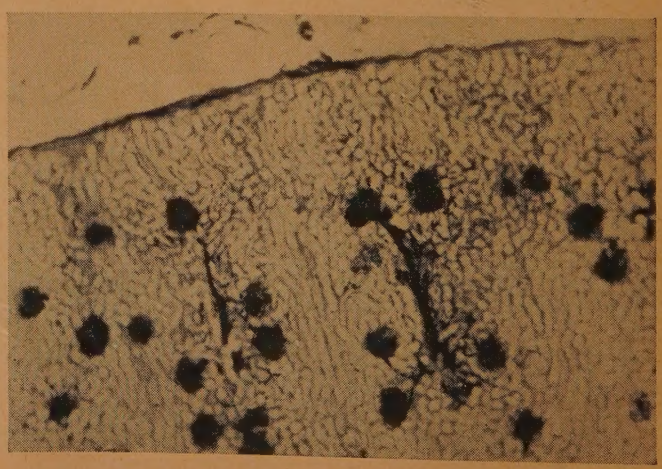
Of all organs in the human body, the kidney has had one of the most interesting histories. In the earthworm, each main segment of the animal has a pair of minute coiled tubules that drain the coelom or body cavity and open to the exterior through separate pores. From the Greek for kidney, *nephros*, the primary terminology of the urinary system is derived: the tubule is a *nephridium*, its opening into the coelom is a *nephrostome* (kidney-mouth), and that to the outer world is a *nephridiopore*. Cilia line the nephrostome and create a current setting outward, draining the coelom of waste products.

In vertebrates there are nephridial tubules that develop from a ridge of tissue running down each side of the body cavity—to either side of the main axial artery, the dorsal aorta. The cells of this ridge comprise *nephrogenous* (kidney-forming) *tissue*. In certain hagfishes, the lowest of vertebrates, a pair of kidneys develop from this material throughout a half-dozen or so of body segments located far anteriorly—way up near the head. Such a kidney is termed a *pronephros* (plural, *pronephroi*), an appropriate term, since it is not only *pro* (anterior) in space, but also *pro* (first) in time. One of the most powerful arguments for evolution from comparative anatomy is the fact that the pronephros appears transiently during the development of all vertebrates. In man it is found quite early, persists for awhile, and then disappears by the time the embryo is 5 mm long.

This ancient kidney is followed by the development of a second member of the kidney series, the *mesonephros* (middle kidney) in all vertebrates above hagfishes, and remains as the adult excretory organ of other fishes and all amphibia, as the frog. A number of body segments throughout most of the abdominal region produce nephridia that make up this organ, and they use the duct of the pronephros as a ureter, since it is already conveniently located for the purpose. This is the *Wolffian duct*, named after its discoverer, Kaspar Friedrich Wolff who, in 1759, wrote one of the most celebrated doctorate dissertations ever known, *Theoria Generationis*. In the course of this treatise on development, Wolff worked out in detail the succession of kidneys in chick embryos.

(Left) Higher magnification of longitudinal section, showing glomeruli and tubules, and, (right) glomeruli in cortex at 80X, injected.





In most higher vertebrates, the mesonephros remains for a considerable period and becomes large and prominent, less so in man, in which species it disappears rather early. In all reptiles, birds, and mammals, this second kidney sooner or later gives way to the third and final excretory organ, the *metanephros* (behind-kidney). Thus we have three successive kidneys in our life cycle, only the last functioning in our postnatal career. The Wolffian duct remains as a reminder of the pronephros, becoming the sperm duct of the male, while another part of the male reproductive duct system, the *epididymis*, is a vestige of the mesonephros. The Wolffian duct and epididymis are truly footprints on the sands of time, recalling anatomically those remote days when our ancestors had scales, fins, gills, two-chambered hearts, and many other piscine characteristics.

The human metanephros, hereafter distinguished simply as the *kidney*, develops in part from nephrogenous tissue in posterior body segments. Tubules are formed that become complex in their looping and folding. Meanwhile, from the hind end of the embryonic Wolffian duct, a new tube, the *ureter*, grows rapidly forward and invades the region of developing kidney tubules. The forward end of the ureter expands into a large basin-like chamber, the *pelvis* of the kidney, and from this numerous *collecting tubules* grow up and finally meet with and join the nephridial tubules.

The completed kidney tubule thus formed has a blind inward end. This expands into a cup, the lips of which then grow around to enclose a *glomerulus*, the cup being *Bowman's capsule*. Near the constricted mouth of this cup an artery is passing and sends a small branch into the cup. This branch, the *afferent glomerular artery*, folds upon itself many times and divides to produce net-like cross connections, making a knot or tangled skein of capillary-like fineness, which constitutes the glomerulus. The farther end of this vessel leaves the capsule, as the *efferent glomerular artery*, alongside the afferent branch, and passes to nearby kidney tubules, breaking up into true capillaries that are re-collected as veins.

The glomerulus and capsule together make up what appears to be a single object, just barely visible to the naked eye, discovered by Malpighi and named in his honor as the *Malpighian corpuscle*. Traut estimated there were about 4,500,000 of these renal corpuscles in a single human kidney. They measure on the average 0.2 x 0.13 mm and constitute the essential structure, for it is here that excretions pass from the blood to the capsule and thence through the nephridial tubule to the ureter, bladder, and exterior.

During further development the tubule lengthens and folds upon itself in a characteristic manner. First it makes a turn or two or folds about the corpuscle from which it takes origin, this part being the *proximal convoluted tubule*. Coming out of this meandering, it dips downward toward the renal pelvis as a *descending limb of Henle's loop*, then doubles back on itself as the *ascending limb of Henle's loop*, to attain the neighborhood of its own glomerulus, where it again winds about as a *distal convoluted tubule*. After this interesting career, each nephridium swings around as an *arched* or *junctional tubule* and joins a *collecting tubule*. This last, through accession of many nephridia, increases in size, functioning as an excretory duct, and the final ones, called *papillary ducts*, open into the pelvis of the ureter.

In modern times it has been discovered that the proximal convoluted tubules also excrete a part of the final waste product and reabsorb certain constituents of the blood extracted in the renal corpuscle. Henle's loops and the distal convoluted tubules reabsorb water.

In gross view, on dissection of a subject, the kidney presents a bean-shaped profile so characteristic that "kidney-shaped" is a recognized descriptive adjective. The "eye" or point of attachment, is the *hilus;* here the renal artery enters, and the renal vein and ureter leave. If an entire kidney is slit open lengthwise through the hilus, the expansion of the ureter into the wide pelvis is seen, as also further cup-shaped or crescentic extensions of this cavity, the *calices*, singular *calyx*, after a part of a flower superficially similar in shape and relations.

Into each calyx projects a nipple-like protrusion of the kidney, the *papilla*, with the openings of numerous papillary ducts. Each papilla is the apex of a *Malpighian pyramid*, wedge-shaped bodies projecting inward from all sides toward the hilus, described by Malpighi in 1666. Collectively the pyramids make up an inner zone of the kidney, the *medulla*. This division contains Henle's loops and collecting tubules. Outwardly lies the *cortex*, with its corpuscles and convoluted tubules. Cortex is bark and medulla is pith in botanical language, and so convenient are these terms for animal organs having inner and outer zones, that the anatomist has availed himself freely of them; the suprarenal, lymph glands, thymus, ovary, and brain and spinal cord, in addition to the kidney, show this type of construction.

In the cat and rabbit the entire kidney consists of but a single pyramid. Man has from two to nine pyramids in the embryonic kidney for each adult one, the larger number fusing into one; from seven to twenty of these fused "simple kidneys" make up the adult organ (Bremer).

A fairly complete histologic survey of the kidney of vertebrates would include

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the following preparations:

1. A thick (50 micra) radial longitudinal section of the entire kidney of a small animal, as the rat, for a general picture of the larger features.

2. A radial cross section through a larger kidney, which will distinguish the characteristic elements of portions of the cortex and medulla.

3. A tangential (i.e., horizontal longitudinal) section through the cortex, and

4. The same through the medulla. These sections (3 and 4) will present the various tubules in cross section, whereby they may readily be compared.

5. A radial longitudinal section of an entire small kidney, with the blood system injected.

TRADE NOTES

Geology Professor Ellis W. Shuler, Southern Methodist University, is very successful in writing an account of geological processes and a description of the origin of chief topographic features of America for the layman who is not primarily interested in geology as a science. In *Rocks and Rivers of America,* in the "Humanizing Science Series," Dr. Shuler hopes that "the romance and occasional levity—may be pardoned." He introduces each main topic with a specific landscape, presents the problems to be solved in determining the origin of the feature discussed, then tells how the chief personalities involved went about a solution.

For example, in describing "How the Rivers Crossed the Ridges," with especial reference to the celebrated water gaps and wind gaps of our Appalachian Mountains, he gives the early opinion of Thomas Jefferson, then takes the reader westward, to journey down the Grand Canyon of the Colorado, where the intrepid, one-armed Major Powell made the studies, in his perilous descent of this great river, that solved the problem of water gaps.

In this volume, the reader will learn how the major features of the landscape are born and how they change throughout their life cycles; the nature and dangers of soil erosion, the necessity for conservation of soils and water. Above all, he will learn to appreciate the landscape because he can then regard his surroundings with more of a knowing eye, and can listen to the many fascinating tales that rocks and rivers have to tell. The photographic illustrations are abundant, excellent, and well chosen, many of them by the author. Pp. xviii, 300; figs. 105. The Jaques Cattell Press, Lancaster, Pa., 1945. $4.00.

Brazil The subtitle of *Brazil, Orchid of the Tropics,* tells what the book is all about—"The story of naturalists' explorations and adventures in the Brazilian jungles and highlands in search of rare flowers." Mulford and Racine Foster made two collecting expeditions to Brazil, specializing in air plants of the family Bromeliaceae, or bromeliads, of which the pineapple is a familiar terrestrial representative. For the botanist, plant lover, or simply for any reader who likes fascinating adventures in distant lands, this volume will prove to be a gem. The authors, in the foreword, warn not to expect a succession of thrills and hair-raising escapes from death, but in spite of this admonition there are plenty of tight pinches. One in particular: Mulford climbed sixty feet up a tree to get a new species of *Aechmea.* First he ran into ants that swarmed all over him, then was attacked by wasps, then got a shower bath of putrid, reeking water from the plants, and lastly found himself all mixed up with a den of vipers that hibernated high up in these epiphytes! But he persisted, got the plants, slid down in a shower of venomous snakes, and sank exhausted in his car, only to have two fingers mashed when the car door slammed on them!

The volume is beautifully illustrated by black and white photographs, four kodachromes, and by pen-and-ink sketches by Mulford Foster. There is much about animal life, people, customs, cities, and little known districts, as well as about plants. Pp. xi, 314; photos 141, 4 in color; 32 drawings. The Jaques Cattell Press, Lancaster, Pa., 1945. $3.50.

AMERICAN SOCIETY OF AMATEUR MICROSCOPISTS

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The *Bulletin* has gone to the beauty parlor and had its face lifted. Volume 3, Number 1 is, for the first time in the seven years of publication of this journal, a printed affair. Chief emphasis in this issue is on a revised roster of all members, with their addresses and interests in affairs microscopical.

APPLE POLISHER

In the field of *Questioned Documents,* previously introduced in this Department, an excellent initial project for the science club involves the study of handwriting characteristics in the form of a contest. So that specimens may be obtained for comparison, each member of the group copies, in his ordinary handwriting, some familiar dictated material, as a paragraph from Lincoln's *Gettysburg Address.* These are signed by their writers and are then collected by the chairman.

A brief talk is then made by the member sponsoring this project, explaining differences in chirography. Close attention to detail reveals that one specimen differs from another by a great many variables: the particular method of formation of each letter of the alphabet, both upper and lower case, size of letters and average number of words per line, amount of pressure applied to pen or pencil, pressure even throughout or greater on upstrokes or on downstrokes, spacings between letters and between words, the running of certain letters together into ligatures, the slant of the writing variations in certain letters according to whether they occur at the beginning, the middle, or the end of a word, connections or their absence between letters, and presence or absence and method of punctuation, care in dotting i's and crossing t's. For example, some people use an English, some a Greek lower case e; some use an English e at the beginning or middle of a word but invariably employ the Greek e to terminate a word ending in that letter. Differences in ways of making capital letters are even more conspicuous than in forming the small ones.

A second dictation is now made, and for this purpose nothing is better than one of the two celebrated short sentences used in testing a typewriter: "Now is the time for all good men to come to the aid of the party," or "The quick sly fox jumped over the lazy brown dog." Each participant writes the chosen sentence on a card in the same manner as for the first dictation, but does not sign; instead, he affixes a code designation on the back of the card, such code having been issued to each member by the chairman. This may be a letter, a number, or a name, such as a city, so that one person is "Chicago," another is "Richmond." The chairman now numbers this set of cards, on their faces, and makes out a key for his own reference in identifying these unknown; for example, card number six, designated as "Princeton", was written by Seymour Jones. None but the chairman sees this list until after the contest.

The cards of the first set are now spread out on a large table where they may be examined by all present; the second set of cards is likewise displayed on a separate table. Each player has a score sheet on which he tries to identify as many as possible of the unsigned cards. Some will prove absurdly easy owing to distinctly unique chirography, but many will be found more difficult and will require close study.